[From Fernelius: Universa Medicina, Geneva, 1679.]

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THE LIFE AND TIME OF ADOLF KUSSMAUL*

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DR. Adolf Kussmaul, the student, physician and teacher, painted of the century in which he lived the following most appreciative picture:

I consider myself most lucky to have passed through life as a child of the nineteenth century, since in no other of the innumerable centuries which have passed, has thankfulness been more obligatory. None is comparable with it in enthusiasm and ability to penetrate the secrets of Nature, none has advanced the general welfare and made life more pleasant with the same measure of inventive spirit, and finally none has scattered more decisively and victoriously the chains of slavery in all parts of the world.

Nature has set the bound of time and space for all things, however; in this country, man entered the titanic struggle with her, with greater determination and succeeded in breaking through the bounds which it set for the senses and bodily energies. Aided by the instruments of science he is now able to master time and space, matter and energy. He separates matter into its elements and forces its atoms to enter new combinations which result in new properties and values. With the spectrum he analyzes the structure of the organic world. Back of the changeable forms of natural forces he recognizes their oneness and uses them as he sees fit. Cunningly he takes the rays of light, laden with power, and penetrates opaque objects. Obediently, warmth and electric current set in motion shovels and wheels. This century has girded the earth with iron rails. With the aid of steam wagons and ships, ways have been opened for free exchange of goods and thoughts. The spoken work passes with the speed of lightning from city to city and from country to country; written messages speed over countries and oceans—yes, and the phonograph charms the voice of the dead from the depth of the tomb. . . . With a better outlook on life than the theosophy of the past centuries the present century dared to apply the exact sciences for the solution of the problem of creation.

As a science and art, medicine has kept pace with the natural sciences and technical arts. She broke the unnatural alliance which she had formed with speculation, and took her right place among experimental sciences. As a sister to biology she shares the methods and instruments. Rich in inventions and discoveries, she lights up the dark depth of the body recesses.

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She measures the moving and sensible powers of the nervous system and exposes the murderous enemies, which, unnoticed break forth from their hiding-place to visit individuals and nations with terrible plagues, and attempt to disgrace the skill of the physician, surgeon and obstetrician. No longer is the medical science hopelessly exposed to the poisonous arrows of the gruesome nature which ruthlessly destroys that which it has just created. Medicine has accomplished two triumphs which previous centuries never surmised. She has learned how to penetrate painlessly the sensitive parts of the body with the knife, and how to preserve the wounds from the pranks of sepsis.

Such expressions are especially significant when made by a man and a member of a family who were so instrumental in lifting the science of medicine to a higher plane.

The Kussmaul Family

According to Dr. Adolf Kussmaul, his family name is of Swabian origin. The originator of the Kussmaul family in the Grand Duchy of Baden was a carpenter by this name, who came from Wurtemberg to the country village of Soellingen near Durlach in 1701. The Kussmauls became a prosperous family in this farming community. The origin of the rather unusual name, Kussmaul, and its original derivation and meaning, have not been definitely ascertained. Translated into English the name means "Kissing mouth." It can readily be understood that such a name might at times cause embarrassment or again amusement, as it actually did to Dr. Adolf Kussmaul. In 1859, when he was called from Heidelberg to Erlangen, he read a paper at his inauguration entitled "Untersuchungen über das Seelenleben des neugeborenem Menschen." This paper enjoyed great popularity and entered its third edition in 1896, thirty-six years later. However, when this article was presented to a certain prominent woman, who was especially interested along this line, the author's name disturbed her and she is reported to have said: "No! It is impossible. No one can have such a name!" Some years later, however, this same prominent woman did not permit this "impossible name" to stand between her and the much sought medical advice of its bearer.

Kussmaul was not the only name of this type in Baden, as its owner experienced at a dance in Karlsruhe in the winter of 1849–1850. While the dance was in full swing a printed poster suddenly attracted attention. It announced that the gathering was honored by the presence of Mr. Kuss, Mr. Kussmaul, and Miss Küssweider.

On another occasion, while he was in military service, an old colleague of his in Schleswig-Holstein had requested the military physician of the battalion from Baden to stay at his home while in the province. When Kussmaul reported at his home the doctor was out on a call and he reported to the doctor's beautiful wife. At first she did not seem to understand his name and asked him to repeat it. He spelled it for her and thereupon she laughed disconcertingly at him.

At Heidelberg Professor Nägele, whom Kussmaul was assisting, advised him on several occasions to have his name changed because of the embarrassing moments that such a name was bound to bring him at times. Kussmaul, however, did not allow himself to be disturbed thus, but one day dryly ventured the announcement to Professor Nägele:

> My family comes from the oldest medical nobility. We are descendants from the great Oribasius, the well-known body physician of Julian. After the death of the Kaiser it is known that this nobleman was banished from the court and settled with the Goths near the Danube River. Here the name was translated to Kussmaul. *Os*, the mouth, and *Basium*, the kiss, or together *Oribasius*.

Kussmaul relates that this was great food for the humor of Doctor Nägele. At a faculty gathering soon after Nägele made the remark that his assistant was the most aristocratic of all the faculty since he was a direct descendant of the great Oribasius. There was a ripple of laughter but at a wink from Nägele, Dr. Puchelt, who was somewhat of a genealogist, gave the story a plausible aspect and Kussmaul enjoyed greater popularity for a season. The next morning, however, Dr. Puchelt, because of a troubled conscience, wrote a note to Nägele explaining that Oribasius was a Latinized Greek word with a different meaning. He stated that it had nothing to do with mouth and kissing, but was derived from ὄρος, meaning "hill," and βαιςω, meaning "I go." A translation of Oribasius therefore, would be "Hillgoer" or possibly "Hillman."

Twenty-five years later Kussmaul read in a book on genealogy, written by Ludwig Steub (Munich, 1870) that his family name was of Old-German origin. According to this interpretation "Kuss" comes from "Kusso" meaning "The Good One" and "Maul" from "Mulo" or "Mutilo" which means "The Energetic One." This Old-German origin Kussmaul felt was correct, especially since certain characteristics, such as long skull, blue eyes and blonde hair, were still retained in his family.

GRANDFATHER AND FATHER KUSSMAUL

Johann George Kussmaul, the grandfather of Adolf, a *Feldsherer* (army surgeon, one who changes dressings), lived in the little country village of Soellingen, and bore the official title of "Chirurgus." He had the entire medical practice of the village. At that time it was not customary to call a regular physician, who usually lived in a larger city, unless someone was about to die. Accordingly, a doctor appeared in the village only two or three times a year, and on such occasions there was one question on every lip, "Who is dying?" The grandfather died at the early age of forty. The grandmother, with a family of four, managed to make a living on a small farm.

Adolf's father was born in 1790 and because of his father's early death was forced to assume considerable responsibility about the little farm. He was a thoughtful boy and loved reading. On one occasion the preacher found him reading and memorizing songs while out in the meadow herding the cows. The preacher offered to give him lessons in Latin, an offer which he accepted. His donor then took him to Durlach, where he induced the official surgeon, Kaercher, to give him the necessary training for a medical course. His further studies were carried on in Bruchsal, where he passed his state examination for surgeon (*Wundarzt*) in 1814. He then entered service as military physician. While on a long military march he contracted typhoid fever and was forced to make his bed in a heap of straw in a military wagon. He recovered without serious consequences. It was customary at the time to confine typhoid fever cases in closed stuffy rooms, and to forbid water as a drink. Wine, on the contrary, was recommended. Because of such treatment typhoid fever was much dreaded and the mortality rate was high. Kussmaul's father concluded that the reason for his uneventful recovery was the open air treatment. In his practice he always advocated fresh air and good drinking water in such cases.

In 1819, after he left the service, he went to Wurzburg, where Schönlein had just made for himself an enviable reputation. Here he studied anatomy under Hesselbach, physiology under Doellinger, and clinical cases under Schönlein. A notebook compiled in Schönlein's Clinic 1819–1820 is of historical interest. From this it may be deduced that Schönlein did not at that time (1819) teach percussion and auscultation, although in France they had been in use since 1808. Some years later, however, Schönlein gained great reputation for his new and scientific methods and teachings. In empyema Schönlein had emphasized such uncertain symptoms as numbness of the arm, but not a word about percussion. The majority of the eighty-four cases listed were diagnosed as synocha, febris nervosa, febris gastro-rheumatica, typhus e torpore, lienitis and others which were rarely or never used in clinics fifty years later. Schönlein attributed bleeding from the stomach to lienitis. This concept was not changed until Cruveilhier and Rokitansky established that such bleedings were due to stomach ulcers. That much of Schönlein's practice was based on philosophical deductions is shown by the following extract from the notebook:

> Liver and spleen are two oppositely placed poles, as are also iron and mercury. Iron is the stiffest and most solid, mercury the softest and most penetrable of all metals. From this a theory regarding the value of iron in diseases of the spleen can be deduced. Just as mercury is helpful in diseases of the liver, so iron is in the diseases of the spleen.

Schönlein's change from such unscientific to scientific thinking must have occurred soon after the compilation of this notebook.

In 1820, father Kussmaul passed his state examination as physician, surgeon and obstetrician (*Arzt, Wundarzt, Hebartz*). Immediately after his examination he was appointed assistant physician in Graben in the province of Karlsruhe, with the official title of Grand Ducal Staff Surgeon.

In 1821 he married Louise Böhringer, daughter of the owner of the glass factory Buhlbach at Freundenstadt in Wurzburg. He was a very active country physician with a very heavy practice. In the summer of 1850, at the age of sixty, he died from cardiac failure. For thirty years he had suffered irregularities of the pulse without objective symptoms. In later years his pulse became very irregular and this condition was accompanied by periods of dizziness. He confided to his son the belief that his death would come suddenly and requested him to perform an autopsy in such an event. "You do not realize," said he, "how much your findings will interest me." He died as he had prophesied, and one of his colleagues performed the requested autopsy. The heart muscle was greatly atrophied and had the appearance of pale yellow wax. No other pathological change was noted.

Adolf Kussmaul, Birth and Early Years

Adolf Kussmaul was born on February 22, 1822. He was the first born in the family and as such received much attention. He weighed six and one-half pounds. Six other children were born into the family. The earliest incident in Dr. Kussmaul's life of which he was cognizant occurred in the kitchen of his home. Unmindful of danger he ran against the legs of the cook just as she was removing a kettle of boiling water from the stove. The cook lost her control and poured part of the water over the youngster's head. He cried furiously and his mother came and took him in her arms. The next scene which he remembered was that of his father leaning over him and examining the damage which had been done. As an objective remembrance of this incident he retained a deep scar on his head which was covered only by the hair growing around the periphery.

In 1828 the family moved to Boxberg, where young Adolf was to attend the public school. The schoolmaster was an oversized ex-soldier whose sole ambition was to impress upon the youngsters the honor of being a soldier, and the necessity in war, of treating everyone as roughly as possible without respect of person or property. Adolf's father did not permit his son to attend this school very long but obtained a private teacher for him who, too, proved unsatisfactory. His father's practice chanced to take him to a neighboring town where the preacher's wife was dying of consumption. She had taken much snail juice and had slept for some time in the cowbarn, a therapeutic measure which was widely recommended. Adolf's father made the woman's dying moments as comfortable as possible, and as a return favor the preacher offered to give Adolf instruction. It took Adolf about one hour to walk to the preacher's house. However, after a week or so it took him several hours longer. Nature interested him more than books, and he spent most of the day on the road. The preacher saw that no progress was being made and advised his father to send his son away from home to a private pedagogue. There was no place to go, so the father took the nine year old boy with him on sick calls and also to autopsies. On the way his father taught him *amo, amas, amat*. However, when instead of talking Latin, his father told him the names of birds and flowers, or related incidents from history, he showed much greater interest. This method, however, did not continue long, for the preacher told the father of his son-in-law, who without question would make a good teacher for Adolf. Adolf thereupon was sent to his new teacher, the Reverend Ganz, with whom he remained for two years and from whom he received a training which moulded his entire subsequent life.

In the spring of 1833, at the age of eleven, he entered the Gymnasium at Wertheim. The preacher in whose home he was placed had so many children of his own that Kussmaul received little attention. His whole stay at Wertheim meant little to him. The only incident that interested him in later years happened on the day he stole away to go fishing. One of the group of children who were playing up-stream fell into the river. The rest of the children raised a terrible noise, and frightened, lest the police should come, ran to their hiding places. Adolf saw the child coming down the river. He reached over the edge of the bank, caught its dress as it passed, and pulled it safely to shore. Noting the rescue the other children returned, but Adolf, in turn, fearing the police (a fear which was instilled in every child at an early age) left his fishing equipment and ran to his room as fast as he could. Two things he feared: the wrath of the preacher and the police. The former he received in the form of a lecture. A few days later, while still harboring the fear of the police, a man approached him and said: "Are you the boy who pulled my child out of the river? I am the foreman of the glass factory and would like to show my appreciation. Kindly take this coin." Bewildered he took it and started to run. After he had gone a short distance he turned to look back and saw the foreman standing at the same spot, looking after him with a pleased but amused smile.

In the spring of 1834, because of his father's transfer to Wiesloch, Adolf entered the Lyceum at Mannheim. Theoretically there was little difference between the Gymnasium of Wertheim and the Lyceum at Mannheim; the former had five grades and the latter six. Practically, however, there was a big difference. The Lyceum of Mannheim had an excellent reputation and her sons spoke of her and her faculty in words of praise only. However, in the best families difficulties will arise. The students, who as a rule were well behaved, could not contain themselves at all times. At times they would spend their superfluous energy on the French professor, who was perfectly helpless when it came to discipline. On one such occasion, however, he called the Director of the Lyceum, who brought with him the school porter who had charge of the rod. The four worst offenders were called and each received several severe blows on the hand. In spite of such occasional unpleasantries, Kussmaul could not speak highly enough of the fine spirit of the school. He had fallen in love with his work, his fellow students and his inspiring teachers.

When, therefore, the Kussmaul family moved to Heidelberg in 1838 and Adolf had to change to the Lyceum at Heidelberg, he was far from pleased. The faculty and the type of instruction was far inferior to that at Mannheim. The two years which he spent at the "frog-pond," as he called the Lyceum at Heidelberg, he considered as lost. The students were of a rough order and the instruction was carried on in a mechanical way. The professor of Greek and Religion was in the habit of opening his classes with one of two prayers which he used alternately. At the end of the prayer he always turned his face to the ceiling. One morning as he turned his face upward he saw to his great consternation a paper figure dancing merrily in the air. An investigation was called at once. The culprit was found. The student had tied a string to the paper figure and had fastened a spit-ball to the other end of the string. Shortly before the opening of the lecture he skillfully threw the spitball against the ceiling and the figure began its dance. The student was dismissed.

The students were not all of this type, but there were some very studious individuals who were disliked by the teachers for their greater knowledge. Müller was a good example of this type. "Who starts today," began the Latin professor one morning. "Müller," came the reply from all seats. "Good! Müller, decline *ille!*" "Ille, illa, illud." "Wrong Müller! *vivat sequens!* Fischer, you do it!" "Ille, illa, illum." "*Recte dixisti*, you are right! Down Müller! Up Fischer!" But Müller protested. "Professor, in Zumpt's Grammar it says illud." The Professor looked and saw the word in the grammar. "Just see that," he corrected himself, "Zumpt really says illud. Then we shall permit mercy to supersede right. Müller you can keep your seat for all I care."

On another occasion the teacher said: "Müller, on which shore of the Euphrates did Babylon lie?" "On the left, Professor." "Fischer, you answer it better!" "On the right." "Good Fischer, move up!" But Müller protested: "Professor, in my book it says Babylon lay on both shores!" "I want to tell you something," retorted the professor, "you are both right. Your Babylon, Müller, lay on the left shore, your Babylon, Fischer, on the right, and my Babylon on the right and left. For God's sake, you can both keep your places."

In 1840 he finished the hated lyceum course and spent a happy vacation studying Nature. He was now entitled to be called *Maulesel*, a term applied to students who had finished their preparatory work but had not as yet entered the University. The meaning of the term is: "No longer a donkey but not yet a horse." His father gave him preliminary instruction in osteology preparatory to his entrance.

During his vacation one of the first German railroads was officially opened between Mannheim and Heidelberg, September 12, 1840. The following year potato rot occurred in this region and the farmers attributed its cause to the soot from the railway engines. Some years passed before this belief died out. Soon after the official opening, Kussmaul had occasion to travel on it. After the train had started a hat was seen flying through the air and a moment later its owner, a farmer, jumped from the open car after it and landed in the soft sand. The occupants yelled, the train stopped, the farmer raised himself, picked up his hat and unconcernedly entered the train again.

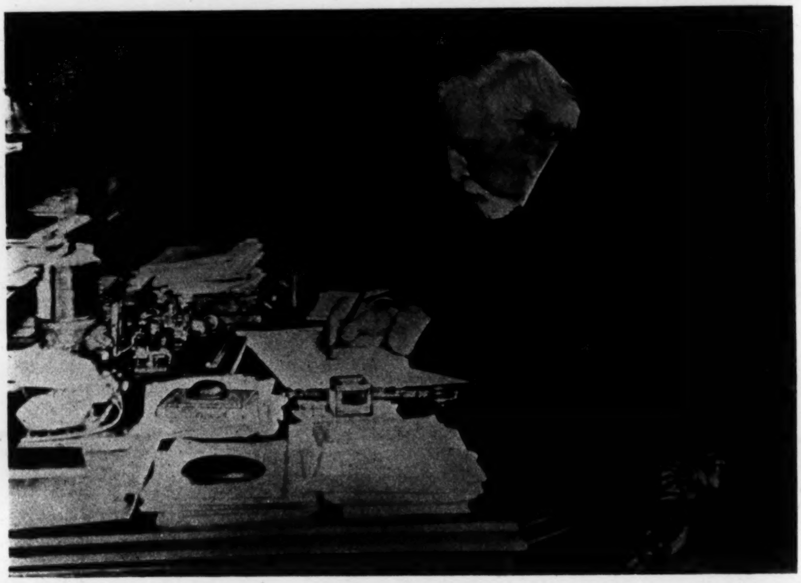
THE UNIVERSITY OF HEIDELBERG

In October, 1840, he began to attend lectures at the University of Heidelberg. As an innocent freshman (*Fuchs*) he devoted all of his time to his studies. Sharp at 8.00 A.M. he was on his way to Anatomy. In his right hand he held his long smoking pipe which almost reached to the ground. Pipes were smoked by all university students as a sign that they were free students and not members of the despised lyceum. Pipes were used both in the long and in the short style, but freshmen as a rule used the long ones because they could be more easily seen. Smoking did not agree well with Kussmaul but he smoked just the same, because he did not wish to be seen without his pipe. The pipe fad was carried to great extremes at Heidelberg. Pipe specialists, whose speciality it was to carve names and pictures on the large pipe heads, were in great demand. Pipe cleaners, too, enjoyed popularity. The large pipes needed frequent cleaning and this was not a pleasant task. Even the new pipe-heads were seldom broken in or smoked for the first time by the owner, but this unpleasant task was done by the boot-blacks who cared less for the good nature of their stomachs than for the extra coin in their pockets.

The pipe was not the only new thrill that came to him in the free atmosphere of the new world which he had just entered. There were many old traditions and new ones were continually created by the free student body. The *Fuchsenritt*, the *Fuchsbrennen*, the drinking parties, the fencing, the student songs and the festive oath accompanying the ceremony of piercing the hat, were part of the atmosphere of his new University world. The latter ceremony was accompanied by the following verse:

Ich durchbohr' den Hut und schwere,
Halten will ich stets auf Ehre,
Und ein braver Bursche sein.

Among all of the student activities there was none that received any opposition except the activities of the student fraternal organizations. The energy of these organizations often led to grievous enmities and often to bloodshed among members of different fraternities. So offensive were the consequences at times that the government was forced to place a ban on them, but in spite of this they continued their activities privately, although their colors were no longer displayed publicly.



ADOLF KUSSMAUL.

Just when and where these fraternal organizations originated is not definitely known. However, more than a century before Kussmaul's time poorly organized bodies of this type were in existence. The organizations were provincial in nature. Students from a given province banded together and thus fostered the provincial animosity against other similar bands, which resulted in periodical "paddlings" of a murderous nature. Karl Fredrick introduced very severe measures for curbing these hideous practices and succeeded in getting a better class of students at Heidelberg. This led to the organization of the *Korps* in place of the provincial groups. They instituted supervised dueling in place of unregulated and merciless paddlings. These organizations were founded on a military basis with free thought as their ideal. The organizations fared well until the revolution of 1830, when because of their free thinking they actively opposed the government. The government again took active measures and many of the members were forced to flee across the border and still others left the University for good. Military fraternities from that time received the anathema of both government and public. Public demonstrations and secret activities speedily resulted in punishment of their partakers. Ten years later, on April 1, 1840, when Kussmaul was finishing his preparatory work, the fraternal organizations proved themselves to have gained a considerable strength. At the funeral of one of their professors the military fraternal organizations arranged and successfully carried out such an elaborate and pompous procession, in which all non-fraternal students took part, as Heidelberg had never before seen. No punishments followed this public demonstration and activities of the fraternal organizations started anew.

When Kussmaul first entered the University he spent all of his time at his books and had no thought of joining the *Korps*. He, however, enjoyed company, and so it happened that after his first attendance at the Swabian *Korps* meeting he asked for membership in it. In Heidelberg there were eight or ten different organizations in existence, who fostered at all times a mild, and sometimes a severe, antagonism against each other. Since the *Korps* were founded on a military basis, a thorough knowledge of the use of weapons was one of the prerequisites to membership. The foil was the common weapon, although the sword was frequently used. Pistols were used only on rare occasions, usually when non-*Korps* members requested it in the demanded duel. For months Kussmaul spent three or four evenings of every week on the fencing floor. During the summer of 1841 he passed the requirements and became a member of the Swabian *Korps*. The meetings of the *Korps* were held in a large room which was rented for that purpose. The evening was spent in drinking beer, conversations and fencing. At such meetings the members wore colored bands around their bodies and colored caps upon their heads. The rank of the members was indicated by the number of colors. Those of the highest rank wore three colors and those of the lowest rank only one. The number of fencing contests or duels each had successfully withstood was noted on the bands worn and was also recorded in the membership register. The honor of the *Korps* depended on the fencing and dueling record of its members. A fencing or dueling contest usually took place between members of opposing organizations, occasionally between a member and a non-member and rarely between members of the same *Korps*, and ended only after one or the other had received a wound. The *Korps* whose member was successful, that is, escaped without injury, received the honor. Members, therefore, were continually on the lookout for the chance to challenge someone to a contest. When this was not forthcoming they would break into the meeting of one of the opposing *Korps* and raise "rough house" which always resulted in the desired contest. Kussmaul must have been in a number of these contests, for he states that all of the older members of his organization had indulged in at least ten or twelve and some in as many as sixty. He speaks of only one fencing wound that he received which became infected. Infections of these wounds were very common, since aseptic methods were not in use at the time. Kussmaul states that Dr. Hofacker, who attended all the contests, reported 20,000 cases in twenty-four years. He published several papers in which he reported his experience with such wounds. He reported success in grafting on noses and lips which had been cut off. His reports were instrumental in a degree to keep dogs away from the fencing floor, since on one occasion a dog picked up the tip of a nose which had just been cut off and ate it with great relish. Deadly wounds were seldom inflicted, although severe infections often threatened life. Kussmaul reports six pistol duels which occurred during his stay at Heidelberg, only one of which resulted in death.

The senior members constituted a *Korps*-senate or court. They had control over the *Korps* activities and supervised the dueling.

In place of the custom of one organization breaking up the meetings of another, which often resulted in grievous scenes, the senate decided to have some occasional frolics at which all *Korps* organizations were invited. These frolics frequently turned out to be drunken brawls. Beer drinking duels became a feature of these evenings. If someone objected to a remark that was made he would challenge the offender to a beer duel. If someone were too noisy he was requested to be silent. If he failed to heed this request some member whose constitution could withstand a goodly measure of the spirited sap would challenge the offender to a beer duel. Bravely the offender would attempt to drink the potion the challenger had prescribed by example, but in most cases his head would sink on the table in a deep sleep before the task was accomplished.

Near the end of Kussmaul's senior year conditions in the student organizations became so bad that he and several others decided to organize a new fraternal order which was not based on military principles and to which all students were invited irrespective of their fitness to wield a sword. This organization gained rapidly in popularity and soon half of the student body belonged to it. Other organizations of this type arose. Soon the old order broke up and a new order arose whose activities were more humane.

Before I leave the student activities I must mention the experiences which Kussmaul had on a trip which he took during his vacation in 1842. The money for this trip he had earned by preparing a topographical account of the natural resources in the region about Wiesloch. On the way he stopped at the home of a fraternity brother with whom he spent Sunday. On Monday, when ready to continue his trip on foot into the Schwarzwald, this brother offered to accompany him, which he did. They had hardly started on the trip when his companion asked him how much money he would risk on the gambling machine in the gambling house of Mr. Benazet at Baden. Few excitement-seeking individuals passed through Baden without trying their luck at this game, at which, of course, they were always beaten. Kussmaul asked him how much he would risk and he stated that he would risk just ten florins in order to win sixty florins, so that they could ride to Strassburg in state and eat a fine dinner at the Hôtel de Paris. Kussmaul decided to risk the same amount. On arriving in Baden they wasted no time but went straight to the gambling den. His friend played on the red color and soon lost all. Kussmaul did not lose heart and played on black and soon won forty florins. He divided with his friend. He further tried his luck and lost all. They then went to a hotel for dinner. After dinner Kussmaul wanted to try his luck again. Before he knew it he had only one thaler left. He turned to his partner and informed him that he would have to pay the return fare as his money was all gone. His partner, however, informed him that he did not have a penny left. Empty-handed and broken-hearted they turned homeward. At several places they asked for a loan, but it was in vain. But finally they arrived at the home of his uncle, who was a druggist, and there they received the necessary funds to see them home.

THE MEDICAL FACULTY AT HEIDELBERG

There was hardly a medical school in Germany whose teachings were as soundly founded on accurate scientific methods as were those of Heidelberg, and only Berlin could boast of a faculty with greater reputation. Tiedemann, Chelius and Puchelt were hardly the equal of Johannes Müller, Dieffenbach and Schönlein. Nägele, however, as an obstetrician, enjoyed a reputation equal to any of them, and Berlin had made repeated attempts to obtain him. The faculty, consisting of Tiedemann, Nägele, Chelius, Puchelt, Gemelin, Theodore Bischoff and Kobelt, were all old, and so in 1844 the young anatomist Henle and the pathologist, Pfeufer, were added.

Tiedemann was a man of fine stature. He was tall and slender, with a well-proportioned face. As a lecturer he made a pleasing impression. His lectures were well-organized and were read word for word. He never gave illustrations on the board but illustrated his lecture with demonstrations which his attendant, Jacob, brought at the proper moment. One of these demonstrations was to show the rapidity with which certain substances rubbed into the skin are excreted by the kidney. At the opening of the lecture Jacob stood in the background with a small bottle of turpentine. Tiedemann explained the nature and purpose of the demonstration and at the appointed time Jacob rubbed the turpentine on his hands. He then left the lecture room and in ten minutes returned with the evidence in an open glass dish which was passed from student to student for examination.

In many of the medical schools of Germany, anatomy and surgery were combined in one department with one head, who would unconcernedly step from the dissecting table to the operating table. Tiedemann was the prime mover to have these two departments separated at Heidelberg. At first Tiedemann was in charge of both anatomy and physiology, but during Kussmaul's time Bischoff was physiologist. Tiedemann's anatomical collection and arterial injections enjoyed an extensive reputation. Even the general public found objects of interest in the skeletons of "Schinderhannes" and "Black Peter" which Tiedemann had prepared.

The importance of anatomy he continually held before his students. He advised them repeatedly to spend their free moments in the dissecting room. "Doctors without anatomy," he said, "are like moles. They work in the dark and the works of their hands are piles of dirt."

Tiedemann's two assistants, Professor Kobelt, the anatomist, and Professor Bischoff, the physiologist, were very antagonistic. They were continually at war with each other. Kobelt was an excellent dissector and had discovered the parovarium, which placed his name in anatomy, but his activities and methods as a teacher did not command the students' respect. Bischoff, likewise, made little impression on his students. The antagonism between the two professors finally reached a climax. Certain students had noted hard white spots on the muscle of a certain cadaver and called Kobelt, who took a part of the tissue to his room to examine. Shortly after Bischoff happened into the dissecting room and the discovery was shown him. He, too, took some of the tissue. Soon after two publications appeared on the subject of calcified trichina in muscle. The two had independently reached the same conclusion and published their findings without conferring with each other. They carried their fight into the public papers, and the government had to step in and send them to different universities.

With their removal in 1843, Henle was appointed as anatomist at the side of Tiedemann. In 1832 Henle had received his doctor's degree from Bonn under Johannes Müller. When Müller was called to Berlin the following year he took Henle with him as prosector. He entered the field of investigation with such enthusiasm that within a short time he had amassed much new information. Political opposition prevented him from lecturing and after investigation he was sentenced to imprisonment because he belonged to a *Korps* at Bonn. In 1837, through the efforts of Alexander von Humboldt, he was finally permitted to teach at Berlin.

From Berlin he went to Zürich and in 1844, during Kussmaul's last year, he came to Heidelberg. At Heidelberg he gained unusual popularity. His lectures, illustrated with blackboard drawings, were exceedingly clear and instructive. His unusual enthusiasm for, and his great accomplishments in, research made him an inspiring teacher. His textbook, "Allgemeine Anatomie," (1841) and his "Pathologischen Untersuchungen" (1840) attracted his students.

In addition to these attractions his political experience of the past and his student activities as a member of the *Korps*, of which a fencing scar on his left cheek gave evidence, made him the most popular member of the medical faculty.

With Henle a new era started. Medicine was placed on a more rational basis. Henle had coined the term "rational." He and Pfeufer, who came to Heidelberg with him, started a journal in 1843 entitled *Zeitschrift fur rationelle Medizin.* Medical practice at the time was largely controlled by philosophy, and the accurate anatomical researches of Henle, based on the cell theory, gave rise to a medical interpretation for which the term "rational" was well fitted. In 1846 his "Handbuch der rationellen Pathologie" appeared. Older medical men resented the implication in Henle's new term that medicine as practiced was not rational, and tried to urge war on him, however, with no consequence.

As is still customary, and rightly so, certain subjects in natural science were prescribed at Heidelberg and had to be taken by each student who wished to graduate. One of these, organic chemistry, deserves mention because of its professor, Leopold Gemelin, who with Tiedemann had published two volumes on digestion and independently had discovered a test for bile pigment. Another of these prescribed courses was philosophy. Professor Kapp was especially pleased with the large classes which he always had. Kussmaul signed up for the course but because the room was always filled did not attend after the second session. The next semester, when Kapp announced another course, Kussmaul felt himself obliged to express his appreciation by signing up for it also. He, however, never attended. Through a nephew of Professor Kapp, Kussmaul had become personally acquainted with the old gentleman. When, therefore, at the end of his course Kussmaul called for his grade he was surprised with this remark: "With exceptional industry and great attention."

For centuries the medical instruction at the universities consisted solely of explanations of the works of Hippocrates, Galen and Avicenna. The anatomical reformation of Vesalius in the sixteenth century and the discovery of circulation by Harvey gradually led to systematic research. A systematic clinical instruction was first inaugurated by Boerhaave in Holland early in the eighteenth century. It, however, did not become a universal method until the latter part of the nineteenth century. As early as 1585 the Kurfürst Otto Heinrich advised medical teachers to take their best students along to their medical cases. This, however, was never practiced to any extent. In 1766, Karl Frederick established an obstetrical institute at Mannheim with Franz Anton Mai in charge. When Mai was called to Heidelberg in 1773 he almost at once succeeded in moving the institute to Heidelberg. He further succeeded in obtaining Ackermann as anatomist and surgeon, and Nägele as obstetrician. Thus as early as 1817 Heidelberg had three clinical departments. Franz Karl Nägele was in charge of obstetrics, Maximilian Joseph Chelius of surgery and Puchelt of medicine and pathology. In 1842 a building was obtained for exclusive use by these departments. The clinical instruction, therefore, which Kussmaul received was of such a high order as only few universities in Germany could give.

Only few clinical men could keep pace with Puchelt in general scientific knowledge and literary production. A paper on "Diseases of the Veins" brought him popularity. His main publication, "System of Medicine," in four volumes (1825, 1832, 1835) and many other publications made him a prominent man. Internal medicine as he taught it was narrowed down to calomel and phlebotomy. The extent of this practice I shall refer to later. In physical diagnosis Puchelt was well trained in the technique of percussion and auscultation. He was able to differentiate between pus and air in the pleural cavity where other signs failed. Percussion and auscultation were practiced by few German physicians at the time. On one occasion he was called to a farmer who was quite ill with some thoracic disturbance. Puchelt made a thorough examination with the aid of a plexor. When he finished the farmer smiled with complete satisfaction and said. "Doctor, your pounding did me much good, when will you come and pound me again?"

All of the patients whose diseases terminated in death were autopsied by Puchelt's assistant. The autopsy was not for the purpose of correcting or affirming the clinical diagnosis, but rather to locate the seat of the diagnosed disease. This method was based on the example of Morgagni. The clinician, thus, did not fear lest the autopsy would contradict his diagnosis! Diseases were diagnosed according to the symptoms which they exhibited. The common diseases, thus, were dropsy, jaundice, cyanosis, hyperpyrexia, apoplexy, nausea and dysentery. If, therefore, a disease were diagnosed as dropsy and upon autopsy the lungs were badly affected, the conclusion derived was that the seat of the dropsy was in the lung. This symptomatical aspect of pathology was changed during Puchelt's later years, by the work of Rokitansky, to an anatomical one. Fevers were usually considered as arising in the digestive system and, therefore, emetics and purgatives were in order.

In spite of practices which today appear strange, Puchelt's clinic was one of the best in Germany. His clinic was large and he had from forty to fifty cases under his care daily. When Pfeufer came in 1843 as second clinician, the high esteem in which Puchelt was held began to totter. Pfeufer's ready diagnostic methods were more pleasing to the students than the hesitating methods of the older and wiser master. He was less of a writer but a greater practical worker than Puchelt. In spite of the smaller clinic which was in his care he worked up a reputation which made him the choice among the students.

Pfeufer was not only popular as a teacher but he was tactful socially. As an after-dinner speaker he could not be excelled and his ability to judge good wine could scarcely be equalled.

The surgeon, Maximilian Joseph von Chelius, was a handsome person, medium sized, slender, with fine features. During the summer he gave his lectures on surgery at 5.00 A.M. and ophthalmology at 7.00 A.M. In the operating room he was conservative but skilful. His great popularity centered around his textbook on surgery (1822–1857) which lived through eight editions and was translated into eleven languages.

Among the founders of scientific obstetrics, Kussmaul speaks of his teacher, Franz Karl Nägele, as one who has no second in the accurate investigation which placed obstetrics on a sound anatomical and physiological basis. As evidence of this, he cites his publications on the "Mechanism of Birth" (1822), "The Normal Female Pelvis" (1825) and "The Obliquely Contracted and Pathological Pelvis in Woman" (1839). The term "Nägele pelvis" is still in use. The obstetrical forceps which Nägele invented and used superseded all others at the time, both in lightness and handiness. His textbook of obstetrics, too, was well received and appeared in eleven editions. His lectures were given in an informal manner. He was an interesting lecturer and presented the driest subjects in the most entertaining manner.

Major operations on the female organs and cesarean operations were not practiced. Attempts at such operations were considered as criminal, since they were almost certain to result in the death of the patient. A certain young doctor and student of Nägele received severe condemnation in the public paper for having attempted a cesarean operation which proved fatal. Nägele was called into court to express his opinion as to the necessity of this procedure. When the young doctor was asked why the operation was attempted he testified that he performed it because of the small pelvic opening, which was so small that he could not insert his finger. Nägele coughed, feigned epistaxis and walked out. He summoned the young doctor and asked him why he made such an excuse, for to medical science it was known that at childbirth the pelvic opening was always large. The young doctor, however, insisted on the correctness of his finding. Nägele, however, did not believe him, but in order to give justice to all he insisted on exhumation. The postmortem proved that the young doctor's findings were correct and the young doctor escaped severe punishment.

During Kussmaul's last four semesters he was Dr. Nägele's assistant, which experience he prized highly. On one occasion Kussmaul accompanied Nägele on a consultation which took them on a two-day trip. After the consultation they were invited to visit a famous paper mill. All the ladies of the institution were especially interested in seeing the great German obstetrician. Nägele made use of his wonderful command of words to charm the fair ones. One lady called Kussmaul to her side and told him that of all the doctors in the world Nägele was the most charming. On the way back Nägele directed this question at Kussmaul: "Tell me, did I perform this task well? I tried my best to please the ladies, however, only for your sake. I want you to know how to begin your career in order to get ahead. Believe me, without the ability to charm the ladies the doctor cannot succeed."

While Kussmaul practiced obstetrics only five or six years, he did not lose the inspiration received from his much-thought-of teacher. This is evidenced by his paper on the pathology of the uterus (1859).

On November 22, the University of Heidelberg always celebrated the anniversary of its rededication. Connected with this celebration was the presentation of the Karl Fredrick Gold Medallion to some student who satisfactorily solved a proposed problem. During his last year Kussmaul was asked to prepare a paper on the anatomical, physiological and pathological nature of the color changes in the fundus of the eye. Chelius had proposed this topic and was chiefly concerned in having a critical compilation of the various theories regarding the nature of glaucoma, and especially the reason for the green-blue appearance of the pupil in this disease.

Kussmaul accepted the opportunity gladly. The hope dawned in him that he might fulfill his father's wish and bring home the gold medallion. He began on his work with great enthusiasm. He soon discovered that the solution of the whole problem rested on the questions: Why is the pupil of the normal eye black? Why are the retinal vessels and the entrance of the optic nerve not visible when you look into the pupil? In the previous century Mery had discovered that these structures can be seen when an eye is placed under water. Kussmaul made the same observation and concluded that the solution was to be looked for in the field of dioptrics. That the color phenomenon was due to refraction was conceived by him through this study, but no more. He concluded that if this be the case an optical instrument could be made that would permit one to see the actual structures in the fundus of the eye. He worked hard to perfect an ophthalmoscope and he actually made one and described it in his account of this work. The only trouble with it was that it did not work. He asked Dr. Jolly, the professor of physics, for help, but in vain. He lamented to Dr. Helmholtz that he did not succeed in perfecting the ophthalmoscope which he was sure was possible. It took the genius of Helmholtz to fulfill his dream. Wright, in his history of the ophthalmoscope, credits Kussmaul with two important steps. He was the first to raise and correctly formulate the question as to why the inner part of the eye appeared black. In the second place he was the first to attempt a practical application of Mery's observations.

Kussmaul's paper was published in the spring of 1845. He received great praise for the splendid work and was awarded the gold medallion. The following year the faculty, because of a minority opposition headed by Henle, refused to grant the wish of Nägele that this publication should be accepted as a thesis toward the degree of Doctor of Medicine without further expense to Kussmaul. Most students did not take the degree because of the extra expense. The permit to practice was only granted upon successful completion of the state medical examinations. The degree of Doctor of Medicine did not give this privilege in Baden.

PREPARATION FOR HIS STATE EXAMINATION

In the spring of 1845, after his graduation, the Kussmaul family moved to Wiesloch, where his father was in practice. Kussmaul's friend, Doctor Bronner, also lived in this village. The two at once decided to begin their preparation for their state examinations. Their activities with the reorganization of a fraternal organization at Heidelberg had kept them from completing their preparations. They left their noisy homes and rented a quiet room in another part of the town, where they worked all summer and winter until the spring of 1846, when they took their first examination at Karlsruhe. The last part they took in October, 1846. The examinations were given in three parts. The first was on internal medicine together with anatomy, physiology and natural science; the second on surgery and ophthalmology; and the third on obstetrics. A certificate was accordingly given for the successful completion of each part. The first entitled them to the official title of *Arzt* (physician), the second, *Wundarzt* (surgeon) and the third *Hebarzt* (obstetrician). Many candidates took only one or the other of these certificates. Kussmaul took and successfully passed all of them. The examinations lasted about four weeks. Most of them were written, although in some subjects they were also asked oral questions. Clinical examinations were conducted from 8.00 to 9.00 A.M. From 9.00 to 12.00 noon and from 2.00 to 8.00 P.M. the examinations were written. The oral examinations, when given, were held after 8.00 P.M.

In botany a short oral examination was always held, during which time it was customary for the examiner to feel the candidate's pulse. The examiner in pharmacology was an old and deaf man. At the oral examination, which was always witnessed by the entire committee, he gave a stick of cyanide of mercury to one of the candidates to name. The candidate licked at the poison several times in an attempt to diagnose it. Suddenly one of the irritated examiners called out: "Stop your licking, its cyanide of mercury." The candidate thereupon called into the examiner's ear: "It's cyanide of mercury." This answer gave complete satisfaction.

During the summer of 1846 Kussmaul attended the clinic at Heidelberg. Later in the summer he became assistant in Pfeufer's clinic and remained there during the winter of 1846–1847. His experience, during this stay, was broadening in its nature. Contact and actual experience provided a training which textbook and classroom could not give. Among these experiences were Kussmaul's contacts with miraculous cures. The cook at his boarding house was subject to hysteria. During these attacks she was unable to speak. Medical treatment had brought no relief. Someone had told her of a charm that was sure to cure. It did in her case. Whenever the attacks occurred she used this charm and her voice was restored at once. Kussmaul and Bronner tried for some time to learn the secret and one day their wish was fulfilled. The cook, who had just been subjected to one of these attacks, came to the room where Kussmaul and Bronner were. She pointed to her larynx. She could not talk. She at once began her demonstration. She took three steps forward and mumbled some words, stopped a moment, took three steps backwards and again whispered some words, and then turned her head and spit three times. She then turned to her audience and in a clear voice uttered these words: "Jesus Christ be praised! Gentlemen I am healed." She then explained that after the first three steps she whispered the three highest names. After the three backward steps she said "This is for you, oh devil," and then spit into his face three times.

A messenger came to Kussmaul's father one day and asked him to come to his master, a farmer who had been ailing for some weeks, had lost his appetite, become emaciated and was confined to his bed. The doctor gave him a bottle of yew-tree extract with syrup and told him that he would call in a day or so. When after two days he arrived at the farmer's house, he learned that this harmless medicine had done wonders. The farmer greeted him joyously. "Doctor you certainly did wonders, it was a 'horse-of-a-cure,' it cleansed me thoroughly and dispelled my disease. However, the second dose of these ants I was unable to take. There are still some of them in the bottle in the window." The doctor looked at the bottle and to his great surprise found a number of large ants in it. He investigated the matter and learned that the messenger had rested on the way and when he picked up the bottle which he had set on the ground beside him he found a swarm of ants pushing each other into the bottle trying to taste the sweet juice. The messenger, afraid lest he be reprimanded, brought the modified medicine to his master without a word of explanation.

The belief in witchcraft and animal magnetism was quite general. The physical influence of these activities resulted in many miraculous cures. The child of a close friend of Kussmaul was suffering from epileptoid convulsions. The convulsions had lasted half a day and all of his attempts to bring relief were in vain. In desperation he took a dove and pressed its anus against the anus of the child. The convulsions stopped and did not reappear until the death of the child twenty-four hours later. This practice was called the pigeon cure, and was widely used by the common people.

In later years he once more used this cure in a modified manner. A lady of aristocracy was suffering from hysterics. She had tried many treatments but with no effect. When Kussmaul came to treat her, she had been confined to bed with paralysis of her legs for sixteen years. Every afternoon she had an attack. She claimed that during these attacks her heart stopped beating for ten minutes at a time. She suffered severely and was willing to try anything that money could buy to bring relief. She was greatly impressed by Kussmaul's personality and begged him to come every afternoon during her attacks, because she felt that his magnetism brought her relief. Kussmaul's duties did not grant this time and in his desperation he resorted to the pigeon cure. A pair of turtle doves was secured and when the attack approached the dove was pressed against the thoracic wall overlying the heart. She discovered that the male dove was most effective. This procedure brought great comfort to her and she lived to a ripe old age, but to her last day she received relief from the pair of turtle doves.

The therapeutic measures which were almost exclusively used during Kussmaul's clinical years were purgation, phlebotomy and emesis. The old saying: "Qui bene curat, bene curat." was certainly put into practice. Purgation still is holding its own, but the almost complete cessation of the practice of phlebotomy seems hardly warranted in the face of the wonderful results which were thus secured in the earlier days. Every clinic was well supplied with cupping instruments and they were used daily. In certain communities bloodletting was a routine hygienic measure employed every spring. The blood was thought to become stagnant during the winter and it was necessary to remove this in order that the new which was produced in springtime might have room.

A lady patient of Kussmaul told him that in her earlier years she had a case of encephalitis complicated with peritonitis. Her doctor resorted to seven bloodlettings in six weeks and in addition applied sixty leeches. She recovered and lived to be eighty-three years old.

Kussmaul was not plethoric, but in case of a severe infection in the hand which was accompanied by fever and severe pains in the arm, his doctor removed twelve ounces of blood. He immediately felt much better and recovered completely in four days. Kussmaul was a strong advocate of phlebotomy and severely critized the school at Vienna for trying to do away with the practice. He had two cases of nephritis in an advanced stage which were accompanied by dyspnea. In the one he used the methods advocated by the Vienna school and the patient died. In the other he resorted to phlebotomy and the patient recovered.

Kussmaul was also a strong advocate of emesis. In his own case he resorted to this method repeatedly and always with the desired result. These personal experiences led him to the extensive use of the stomach pump in stomach disorders.

His writings and extensive use of the stomach pump have led some to believe that he was its original inventor. This, however, is not the case, as is gathered from the following extract from Frank Smithies' paper[1]:

> In "*The Journal,*" February 21, p. 606, it appears that our German confreres are exercised over who first suggested and used the stomach tube and when a celebration in honor of the man and the event should be staged.
>
> As so frequently happens in Europe, particularly in Germany, important contributions to scientific and clinical medicine pass unrecognized, should such occur extra muros. To the average German physician, credit for the stomach tube and its employment goes to Kussmaul. Since a celebration in honor of that distinguished scientist and his tube is impending, it would seem proper that the facts relative to the introduction of tubes into the stomach be reviewed.
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> To Dr. Julius Friedenwald of Baltimore we are indebted for a history of this gastro-enterologic milestone.[2] Friedenwald called attention to an article by Philip S. Physick, M.D., Professor of Surgery in the University of Pennsylvania, appearing in the *Eclectic Repository* of October, 1812, under the title, "Account of a New Mode of Extracting Poisonous Substances from the Stomach." Using a large catheter for the purpose, Dr. Physick washed out the stomachs of three months old twins who, accidentally, had been given an overdose of laudanum. One recovered; the other died. In his paper, the writer asserted that he had employed a tube for washing out the stomach during the preceding twelve years, and had for "many years" recommended its employment in his lectures. In 1809, according to Friedenwald, Dr. Physick's nephew, a Dr. Dorsey, placed on record a case similar to Dr. Physick's twins. In 1822, an English surgeon, Dr. Jukes, published an article in the London "*Medical Repository*" entitled "Description of an Apparatus for Removing Poison from the Stomach, invented by Mr. Jukes, Surgeon," but presumably made no mention of the paper of ten years earlier written by Dr. Physick. Thus, the view was generally accepted that the stomach tube was of English origin. It was not until 1867 that Kussmaul employed gastric lavage on the now famous (in Europe) "Marie Wiener," who was affected with enormous dilatation of the stomach consequent on pyloric stenosis due to the cicatrix of a large peptic ulcer. Kussmaul's paper "Ueber die Behandlung der Magenerweitering durch eine neue Methods mittelest die Magenpumpe," did not appear until years later.[3]
>
> Kussmaul, seemingly, gave no credit in his writings or his lectures to Drs. Dorsey, Physick or Jukes. Apparently, too, he had little conception of the diagnostic possibilities of employing the stomach tube in securing gastric contents for analysis: he seemed content to emphasize tube lavage only as a therapeutic agent. Further, it remained for Jurgensen (1870) to point out that the "pump" of Kussmaul was objectionable from the standpoints of cleanliness and practicability. Jurgensen employed the soft rubber tube and introduced the principle of siphonage in securing specimens for observation and as a means of lavage.

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[1] Smithies, F. *J. A. M. A.*, Chicago, 1925, LXXXIV.

[2] *Proc. Am. Gastro-Enterol. A.*, 1917; Introduction, Tice's "Practice of Medicine," VII, Sect. X, p. 15.

[3] *Deutscbes Arcb. f. klin. Med.*, Leipz., 1869.

During the winter of 1846–1847, while assistant in the clinic at Heidelberg, he himself became ill with acute articular rheumatism complicated by pericarditis. His treatment consisted of a cold pack on his heart and a daily sponging of joints with a warm 0.5 per cent solution of potassium hydroxide. The latter treatment always brought relief. He was confined to his bed for two months, during which time he took little nourishment. Bed sores also developed, which added to his discomfort. During the latter part of February his appetite returned and he soon recovered. His heart remained irritable for a long time, especially to coffee and tea, but not to wine.

TRAVELS AND STUDIES IN VIENNA AND PRAGUE

In the early spring of 1847 Kussmaul's strength was rapidly restored and he again met his friends and duties with enthusiasm. A number of his classmates, among whom was his closest friend, Dr. Edward Bronner, had just returned from Paris, where they had spent the winter and had equipped themselves with the latest medical instruments and methods. The newest among these was the use of ether as an anesthetic. Eli de Beaumont, on November 13, 1846, presented to the "Academie der Wissenschaft" a letter from his friend Dr. Charles Jackson. From this letter it appears that on September 1, 1846, a dentist Morton, upon the suggestion of Jackson, administered ether fumes and thus for the first time performed a painless dental operation. On October 16, Dr. Warren likewise painlessly opened a cervical abscess. Since Jenner's discovery of vaccination nothing so stirred the medical profession and the public as did the use of ether. The doctors of Paris devised appliances for its administration. It was through Kussmaul's classmates that these appliances and the methods for using ether as an anesthetic were introduced into Germany. It was in Kussmaul's room that the young doctors experimented with the administration of ether on each other. These experiments afforded amusement in several instances when the subjects divulged secrets while under its early influence.

The many new views obtained in Paris caused Dr. Bronner to induce Kussmaul to visit other important medical centers before entering into a practice of their own. Because of financial aid from a friend Kussmaul was able to accept the invitation.

There were three medical centers which they desired to visit: Vienna, where Hebra, Rokitansky and Skoda were making a reputation and where Semmelweis was about to make his epoch-making discoveries relative to asepsis and puerperal fever; Prague, where Oppolzer was in charge of a large clinic and a hospital of 150 beds; and Berlin, where Virchow was gaining a reputation by his micropathological studies, his opposition to Rokitansky's and Skoda's skeptic and annihilistic tendencies in the purely diagnostic values which they placed on pathology, and by his attempt to derive therapeutic and curative values from the pathological findings. Their visits to Vienna and Prague were completed, but their plan to visit Berlin was not realized, due to the outbreak of the French Revolution.

On a beautiful May day Bronner and Kussmaul left Heidelberg, arriving in Munich three days later. Modes of travel were slow in those days and as a result they had plenty of time to enjoy the trip. They spent some time in seeing the sights at Munich. From Munich they continued their way over the Alps, a trip which they enjoyed very much. After about a month of travel they arrived at Vienna. The first day was spent in having their trunks delivered to their rooms. At the duty office the officers took careful inventory of their contents. At the bottom of the trunk the officers found the anatomical texts of Hyrtl and Rokitansky. These they censored as printed matter and insisted, in spite of protests, that they be taken to the censor. With the books under their arms one of the officers led them to the nearest official censor. Of course no trouble was encountered with the censor and as soon as their trunks were again packed they were delivered to their destination.

From Kussmaul's own description one concludes that he thought highly of the medical building, equipment and faculty of the Vienna Medical Institute. The capacity of the General Hospital, the obstetrical division, the children's hospital, and the hospital for the insane, was over 2000. Cases of almost every description were there. Autopsies were performed on all who died there and also on medico-legal cases which occurred in the city. In all, about 1600 autopsies were performed yearly. The number of childbirths numbered about 3000 annually.

The following characterization of the outstanding faculty members is sketched from Kussmaul's own account. Kussmaul and Bronner arrived at Vienna during the vacation period and the only course given was one on skin diseases by Dr. Hebra. Among the large number of courses which they visited during their stay there, Hebra's was by far the most instructive. From 7.00 to 9.00 A.M. he lectured systematically and interestingly on all forms of skin diseases, and the rest of the morning was spent in the clinic diagnosing the numerous cases of every type.

In the children's hospital he saw the most pitiful cases of septic diseases in children of various ages. In later practice Kussmaul encountered very few of these. He blamed these severe conditions to the imperfect aseptic methods employed. He writes: "As long as the methods for combating sepsis were only imperfectly known, these institutions were hardly better than dens of murderers."

One of the outstanding members of the new Vienna school was Rokitansky. As pathologist a great part of his time was spent in the small, poorly equipped morgue. The morgue, besides the storage place, consisted of two rooms, the small one for the medico-legal cases which occurred in the city, and the large room for the bodies of the patients that died at the hospitals. Rokitansky performed all the medico-legal autopsies and as many others as he was able. His assistants did the rest. Rokitansky dictated the findings in a brief but very systematic manner. Kussmaul reports that in the half year spent at Vienna most of his time was spent at the autopsies of Rokitansky, and as evidence possessed 170 detailed protocols and almost as many short autopsy notes. His records show that he visited about 300 autopsies during his stay there. Kussmaul took great interest in the variations in the position of abdominal viscera, and expresses the view that a knowledge of such variations is essential for accurate diagnosis of the various abdominal diseases.

A most interesting portrayal of Rokitansky is given by Kussmaul in the following paragraph:

> The facial features of Rokitansky bore the stamp of great kindness of heart and of dependableness. Everyone respected him. He was extraordinarily silent. In the morgue he opened his mouth only to dictate the protocol. After I had been a constant visitor at the morgue for four months, it happened one beautiful autumn morning that the scalpel rested for a short period. I took advantage of the short recess by stepping to the door in order to enjoy the fresh air. Soon after Rokitansky came and stood near me in the sunlight, which he enjoyed noticeably. Suddenly he turned toward me, greeted me pleasantly, and said: "This is nice weather." I was dumfounded. Had the daughter of Jairus suddenly arisen from the dead and come to me from the morgue with a loud greeting I would not have been more surprised. I composed myself, however, and answered: "Yes, this certainly is a nice day." The conversation was finished. It was the first and only conversation in which I heard him take part.

Kussmaul states further that while Rokitansky commonly appeared very dry, his eyes would suddenly shine and his whole bearing show great enthusiasm whenever he found an unusual pathological condition. Kussmaul did not take his lecture course but was informed by other students that while Rokitansky was a great anatomist he was but a very ordinary teacher.

As Rokitansky was the chief character in the anatomical sphere at Vienna, so his scholar Skoda became the outstanding individual in the clinical sphere. His specialty was diseases of the chest. He perfected and developed the methods of auscultation and percussion and their interpretation to such an extent that his diagnosis almost without exception was correct. This accuracy was obtained by careful correlation of the findings of auscultation and percussion with autopsy findings. Students from all parts of Germany flocked to Vienna to study diagnostic methods under Skoda. Skoda was not satisfied with revolutionizing diagnostic methods, but centered his severest criticism on current therapeutic measures. He considered all medical remedies as then used as mere guesses, and taught his students so. The great evil in this teaching was that he had nothing to substitute. His students, therefore, left Vienna and entered practice with the conception that their work was to make accurate diagnosis and then substantiate them by autopsy findings. To do nothing is the best policy in internal medicine was an axiom which most of Skoda's students followed.

Not only Skoda, but the whole new school at Vienna took this skeptical attitude. Diphtheria was never diagnosed in the large children's hospital simply because it was considered as a French invention. Even Hebra severely criticized such a disease as argyria. In one of his lectures he made this statement:

> Sirs, in argyria I do not believe. In the stomach silver nitrate is changed to silver chloride and is thus removed from the body through the intestines. We have given this drug to epileptics for years and have never had a case of coloration of the skin. In Paris and Berlin they claim to have numerous cases; it may be that the sun shines brighter in Berlin. Argyria? I wish to place a question mark after it.

Three months after Kussmaul left Vienna he saw a case of it. Most students left Vienna as skeptics, and only that which they saw and heard in Vienna did they believe. Both teachers and students forgot the true mission of medicine, namely to cure, and centered all of their efforts on correct diagnosis and substantiation of this diagnosis at autopsy. The desire to perform an autopsy after a diagnosis was looked forward to more than the recuperation of the patient.

When Kussmaul left Vienna he felt that he had learned much regarding physical diagnosis and more from autopsies but he made it one of his chief concerns to combat skepticism and try to effect cures.

Before leaving Vienna we must acquaint ourselves with Semmelweis, the one man whose thought and work turned away from the skepticism of the young school at Vienna to the problem of effecting a cure. His influence on Kussmaul was profound. Kussmaul describes Semmelweis in the following words:

> He was a man of more than medium size. He was broad and well built. His face was round, his cheek bones were projecting, his forehead was high and the hairs on his head were few in number. His hands were unusually busy and deft. He had a lively temperament, great power and joy for work, and a warm and sincere heart.

Semmelweis was greatly attracted by Kussmaul and gave him all the help possible. After he had attended Semmelweis's course in surgery, Kussmaul was permitted to practice in the obstetrical hospital for six weeks, a privilege seldom granted. Semmelweis was always ready to help, even when tired after a night's watch at the sick bed or busy with many duties.

On March 13, 1847, shortly before Kussmaul came to Vienna, Semmelweis had made his epoch-making discovery concerning the cause of the widespread existence of puerperal fever. Dr. Kolletschka had contracted a blood poisoning at an autopsy and died. At the autopsy Semmelweis noted that the autopsy findings were identical with those of patients who died from puerperal fever. He concluded that Dr. Kolletschka contracted the poison from the decomposing body through a cut on his finger, but that the poison was carried by doctors from the autopsy room to the women in confinement. He had also noted that the percentage of puerperal fever cases was much greater in the obstetrical division which was attended by doctors who were connected with autopsies. He, therefore, required all those who conducted examinations at childbirth to wash their hands in chloride of lime before the examination. The percentage of cases dropped almost at once.

In spite of these facts he met much opposition, even from Dr. Klein, who had charge of the obstetrical hospital. The opposition grew throughout the life of Semmelweis, but in spite of this he worked harder to perfect methods to prevent this dreaded disease. It was not until after he died that the value of his discovery was recognized. Among all of the men Kussmaul met at Vienna there was no one he regarded so highly as Semmelweis.

On December 27, 1847, Kussmaul and his friend Bronner left Vienna for Prague, where they arrived the following afternoon. They stopped at the Blue Star Hotel. The following morning, before they could leave to find a more suitable rooming place, five servants at the hotel reported for a tip or *drink geld* as they called it. This practice Kussmaul was introduced to in Vienna. In Germany this custom was not tolerated.

To the great surprise of Kussmaul the Medical School at Prague was visited by a much larger number of graduate doctors than that at Vienna. The reason for this was that the courses were more practical and interesting. Matters of practical value to the physician were emphasized and the spirit of skepticism was, therefore, not so noticeable as in Vienna.

The outstanding teacher was Johannes Oppolzer. His great interest in his students and his desire to give them every opportunity for study brought him high esteem.

The neuropsychiatric institute at Prague, with excellent courses on the subject, was another reason why Prague was so popular as a medical center.

After three months' stay at Prague, Kussmaul and Bronner decided to go to Berlin to become acquainted with Professor Virchow, who was just gaining great reputation as a pathologist, first because of his critical attacks on the skeptical teachings of the school at Vienna and secondly because of his use of the microscope in pathological description and diagnosis. Two days before they had planned to leave for Berlin they received word of the French Revolution with accompanying border trouble. Kussmaul at once decided to leave for his home and join the army. He arrived at Heidelberg the latter part of March, 1848, and within a month applied for the position of army surgeon. On August, 13, 1848, his battalion began their march to the north coast, where the Danes were causing trouble. Instead of leaving early in the morning, when it was yet cool, a farewell party was instigated. As a result, many of the soldiers were intoxicated or nearly intoxicated. When they finally started, the sun beat uncomfortably on the already toxic soldiers so that by noon dozens of them lay along the road. Kussmaul was busy all day resuscitating them, and luckily no casualty resulted. When the battalion reached Holstein they received orders to return. On the way back an epidemic of cholera broke out among the soldiers. Because of the excessive loss of fluid from the body in this disease the blood was thought to be very thick and, therefore, Kussmaul had been taught to resort to phlebotomy. His first two patients thus treated died soon afterwards without experiencing relief. Thereafter Kussmaul never drew blood from cholera patients. Other cholera patients died, but many recovered after administration of opiates.

In October, Kussmaul was promoted to chief physician. On April 14, 1849, he was ordered to take charge of a battalion which was in active service on the battle front in Schleswig. When he arrived there he found only two soldiers who were still in a serious condition as a result of wounds received in a previous battle. During the remainder of his stay there the battle front guarded by his battalion was quiet. The only surgical case he had was the amputation of an arm of a soldier who accidentally discharged his gun while on a forbidden hunt.

In July, the Danes concluded several successful battles, which resulted in the peace treaty of July 12, which gave Schleswig to Denmark. One year later Holstein was also given over.

During the early summer, before the peace treaty was concluded, mutiny arose in the army of Baden. At first the insurrection seemed to be successful, but by the middle of the summer the rebels were defeated and large numbers taken prisoners.

When Kussmaul returned from Schleswig and Holstein, he was placed in charge of the sick among the prisoners. After repeated requests he was honorably dismissed from the army on December 27, 1849.

Kussmaul in Private Practice

During his military service Kussmaul was located at Kandern for several months. He made many friends there. When, therefore, one of the local doctors left Kandern, Kussmaul was asked to begin his practice there, which he did early in March, 1850. He rapidly established a splendid practice. This rapid prosperity was chiefly responsible for his decision to establish a home of his own. The wedding was set for August but the sudden death of his father necessitated its postponement until the latter part of September, 1850. Mrs. Kussmaul, a bright, witty, attractive, but devoted young woman, proved to be a great source of comfort and inspiration to Dr. Kussmaul during his severe illness several years later and during the consequent trying period of his life when he was forced to lay down his heavy country practice and prepare himself for the academic career.

Kussmaul's practice in the country surrounding Kandern was among two classes of people. The one, a mountain folk, was sturdy, uncultured and superstitious. They agreed with their local druggist that in the curing of a disease the axiom of Hahnemann was trustworthy: "Similia similibus." Thus for a case of volvulus an extract of horse apple (*stercus equinum*) was prescribed, not in homeopathic but in allopathic doses. Tumblers' full were taken at a time. In spite of the control the druggist had over these folk, Dr. Kussmaul had many calls from them. It was they who invariably would ring his door bell at 4 A.M. in order to have the doctor perform a phlebotomy or prescribe a strong medicine. (A mild drug was not acceptable). A strong brandy or a bitter medicine was most welcome. Autopsies were not permitted by these people. Kussmaul performed only one autopsy amongst these mountain people and that was on the wife of a young, somewhat enlightened carpenter. This permission was obtained after informing the carpenter that the doctor would ask no fee for his services if the autopsy were permitted. The autopsy was performed, but under severe protest of the neighbors.

The other class of people was the lowlanders. They were enlightened progressive farmers whose livelihood came from raising wheat and making wine. Their attitude toward autopsies was very different. They looked forward toward an autopsy with a keen sense of curiosity. On one occasion an elder of a church came to Kussmaul and requested him to consent to autopsy his daughter as soon as she died. He stated that she suffered with a chronic tuberculous peritonitis, was much emaciated, her abdomen was greatly swollen and that her death was to be expected at any moment. He requested the autopsy all the more because all the members of the church were anxious to know what an autopsy would reveal. Dr. Kussmaul informed the elder that he did not consent to an autopsy as long as there was life. He found the girl under miserable care. He ordered cleanliness, absolute rest and proper food. To the surprise of even Dr. Kussmaul the girl recovered.

Among these two classes of people Kussmaul experienced an unusually heavy but entertaining practice. The lowlanders kept him late at night and the mountaineers woke him long before the sun was up in the morning.

In spite of this heavy work Kussmaul found time to read and write. He kept up with current medical literature and wrote accounts of unusual cases in his own practice. The first of these, entitled "Zur pathologischen Anatomie des Rheumatismus acutus articulorum," appeared in the *Archiv für physiologische Heilkunde.*[4] He reported two cases. The one healed spontaneously, the other he autopsied. Two years later Chassaignac characterized this type of disease as osteomyelitis. Both of Kussmaul's cases were complicated by rheumatic inflammation, namely pericarditis and polyarthritis.

A second paper, entitled "Belege zur Kontagiosität der Ruhr, nebst einigen Bemerkungen über ihre Therapie," appeared in the *Mittheilungen des badischen ärztlichen Vereins.*[5] This was an epoch-making masterpiece on the dread epidemics of dysentery which were so common at that time. He showed himself to be a real teacher of therapy. In the following paragraph he tells from his own experience in handling cases in the army and in the vicinity of Kandern that the methods used were wrong:

> Having had my attention called, in several severe and death-threatening cases, to the fact that by the use of energetic drugs, especially calomel and opium, the condition was aggravated, and that by the discontinuance of these drugs and the use of indifferent mixtures marked improvement and healing resulted, I have, in more than thirty carefully observed cases, employed the therapy of waiting, and my patients appeared to me to be doing better.

"Stomatitis septica" was the title of another paper which appeared in the *Mittheilungen des badischen ärztlichen Vereins.*[6] This was a novum, as autopsy reports were known of only in the cities where Rokitansky and Virchow were active.

Again, from his own practice he wrote a paper entitled: "Erfahrungen über den Abdominaltyphus in der Umgebung von Kandern in den Jahren 1850–1853," which appeared in the same journal.[7] He presents etiology, symptoms, prognosis, pathological anatomy and therapy. In the treatment of these cases Kussmaul followed an antisymptomatical course. In high fevers he gave vegetable acids or dilute hydrochloric acid; in obstinate cases of constipation, mild laxatives such as tamarind and a little potassium sulphate; in severe cases of diarrhea he gave silver nitrate, which actually brought the desired results. When uncertain, Kussmaul emphasized plenty of fresh air and cold water.

Another paper, entitled "Gallensteinkolik und Phlebitis hepatica mit Ausgang in Ascites," also appeared in this journal.[8] One of his cases, a woman, used aurum muriatico natronatum and recovered from a severe case of dropsy. Kussmaul does not believe that the drug caused the cure. He says literature is full of remedies where recovery occurred while they were employed. He knew of a case where cancer of the stomach healed while the patient was on a milk diet. He, however, did not believe that the diet caused the cure.

At the time when some of these papers appeared and when others were still in press, Kussmaul was confined to bed with a severe case of what he called "meningitis lumbalis." Kussmaul, in his autobiography, gives a picturesque description of the unusually busy winter and the consequent weakening of his body which was the cause of the contraction of this dreaded disease, which forced him to lay down his duties as a country doctor. The winter of 1853 was mild until February, when severe weather set in. Sickness was very prevalent throughout the winter, but increased tremendously with the onset of ice and snow. Kussmaul was unable to attend to all of the cases. Not a night passed in which he was not called from his bed. He could no longer eat his meals at regular hours and did not eat enough. Already in an overtaxed condition, he accepted a consultation call to a neighboring town. The trip was made on horseback. He started before sunrise and returned late at night. On the way home he had a feeling in the soles of his feet as though he was walking on rough felt. It was a skin paralysis, but Kussmaul did not realize its serious indication. He had hardly retired when he was called on a case which kept him the entire night. When he returned home the sun had arisen and new work was awaiting him. Night came again and he hoped to gain the desired rest, but he had hardly retired when he again was called to a case which kept him all night. The new day had its work in store. Immediately after breakfast he made a trip by sled to a neighboring town. Snow was falling fast and by the time he reached his destination he was wet to the skin. On the way back the sled tipped and he fell in the deep snow. He could not retire at once on returning home and after he did retire did not get warm until midnight. He had hardly fallen asleep when he felt severe pains under his left scapula. He feared pleurisy. A fever complicated his condition and he spent a sleepless night. Toward morning when he was about to go to sleep a messenger came to remind him that he had promised to perform an operation on hairlip. There was no other way; he kept his promise and completed his operation successfully. The little girl on whom the operation was performed developed a beautiful face. When Kussmaul returned home he had to write prescriptions for several farmers before he could retire.

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[4] Stuttg., 1852, XI.

[5] Karlsruhe, 1853, No. 2.

[6] 1853, No. 8.

[7] 1853, VII, No. 13.

[8] 1856, No. 19.

His condition had reached a serious state and could be readily diagnosed. His legs were weak and cramps occurred frequently. He could hardly stand. His feet were senseless and his bladder was paralyzed. Pain was intense. Spinal meningitis was the diagnosis. It was a terrible prospect that he faced. Either the infection would ascend, paralyzing his arms and finally his respiratory mechanism, or else it would halt in the lower parts, causing a permanent paralysis of the lower extremities which would make him unfit for his occupation. During the first days he took strong wine and washed his legs with warm water, but his condition did not improve. At the end of the first week worry and anxiety led him to employ a method which he did not dare to use with his patients. He took one grain doses of tartar emetic at two day intervals. Unusual vomiting ensued. His conception of meningitis was erroneous. He thought a fluid had formed in the meninges similar to that found in the joints during acute articular rheumatism. He hoped that by excessive vomiting this fluid would be drawn from the spinal canal.

This method brought results: after the third dose the paralysis of the bladder subsided. The paralysis of his legs, however, subsided very slowly. It was the middle of April before he could leave his bed and it was a number of years before he could use his legs normally.

As soon as hope for complete recovery was in sight Kussmaul decided to give up his country practice and prepare for the academic life which he had always hoped to enter. He had saved enough money, so he thought, to study for several years, get his degree, and then enter teaching. Seldom does one find a practicing physician give up his practice to enter academic life. Kussmaul did not realize the cost of this change and after two years was almost forced to reenter private practice. Had it not been for the encouragement of his wife during this trying financial period of his life, Kussmaul would never have been able to live the productive academic life which he did.

Virchow had left Berlin. In the autumn of 1849 he was forced to leave because of his democratic views. Virchow, therefore, went to Wurzburg, where he became very popular. Kussmaul was attracted by Virchow and chose Wurzburg for his further study. Kussmaul was now thirty-two years old. He stayed there two semesters and in the summer of 1854 received his degree of Doctor of Medicine. From Wurzburg he went to the psychiatric institute at Illenau, where he gathered many new ideas which permeated his work during the next two or three years. Early in the winter he returned to Heidelberg where in the following year he was tendered the position of *privat-docent.*

When Kussmaul took his doctor's degree at Wurzburg he was excused from writing an inaugural dissertation on condition that he would do so after he got to Heidelberg. His paper on the "Influence of the Interruption of the Blood Stream through the Neck Arteries on the Movement of the Iris and Other Parts of the Head," met this requirement. When Kussmaul wanted to become situated at Heidelberg he learned that before he could lecture he had to pass a doctor's examination at Heidelberg. His doctor's degree from Wurzburg was not accepted as a fulfillment of this requirement. He, however, was not required to write a *habilitation* dissertation because he had some years before written the prize paper on the color of the eye. He had to undergo the ordeal of a promotion and *habilitation* disputation. The thesis which he chose to defend was entitled: "Marriage among Relatives is Improper on Conventional and not on Physiological Grounds." For some unknown reason, maybe because of the extreme novelty of the subject, the faculty permitted it to pass and published it on the bulletin board. Within a few days the topic was the talk of the whole city. The clergy registered severe protests, but the faculty had passed on it and their decision was not changed. At the disputation as many were present as could be packed into the hall. Kussmaul was in earnest and had carefully worded his thoughts so as not to arouse undue criticism from an already enraged crowd. But to make things worse some of Kussmaul's colleagues asked frivolous questions which were greeted by outbursts of laughter from the audience. Kussmaul answered all of these in a purely scientific manner. After the debate had ended and the committee had deliberated a long time, Kussmaul was called in and informed that he was admitted to the rank and file of the faculty, but that he and, more so, his opponents would be reported to the senate for the frivolous manner in which the discussion was conducted. The senate dropped the matter with a reprimand.

When Kussmaul went to Heidelberg he went with the thought of lecturing on pathology. He, therefore, at once conferred with Dr. Hasse, the pathologist, but was informed that there was no opening. Dr. Arnold offered him a place in anatomy and physiology, but Kussmaul turned down this offer. His old teacher, Chelius, advised him to lecture on materia medica, since this important department had been neglected at Heidelberg. Kussmaul saw the opportunity and even though this field was not his choice, he decided to take the advice of Dr. Chelius. The government of Baden at the time also laid great weight on medicolegal instruction, and since Heidelberg had no lecturers on this subject, Kussmaul decided to place two irons in the fire at once. He, therefore, undertook to lecture on materia medica, toxicology, legal medicine and psychiatry. At this time Kussmaul was also successful in obtaining the position of assistant physician to the chief physician of the city of Heidelberg. This position offered great opportunity to obtain practical experience in legal medicine.

When Kussmaul was ready to announce his lectures he was too late to have them printed in the schedule of courses. He, therefore, had to announce them on the bulletin board. To his great surprise, his lectures were attended to full capacity right from the beginning. It seemed that the student body found more interest in Kussmaul's *habilitation* disputation than did his examining committee.

Kussmaul was not a ready lecturer. At first he wrote all of his lectures. Later he made only outline notes, but he always recited his lectures orally before he delivered them. During his forty-two years of teaching, every lecture received individual preparation and only in his clinical teaching was he forced to resort to the extemporaneous method.

Forced by financial circumstances either to be soon recognized as a productive investigator and worthy of a position in the faculty of Heidelberg or to return to private practice, Kussmaul entered with all the strength he could gather into the solution of the problems of the relationship of blood supply to the movement of the iris; the relation of the sympathetics to temperature changes in the ear; the cause and seat of epileptic convulsions and the nature of the rigor mortis.

Four papers appeared on these subjects during the years 1855 to 1857. The first, "Untersuchungen über den Einfluss, welchen die Blutströmung auf die Bewegungen der Iris und anderer Teile des Kopfes ausübt,"[9] was read March 10, 1855. By an ingenious operation he exposed the vessels to the head of a rabbit and by clamping one or the other of all the vessels he studied the effect. An initial constriction of the iris, nasal openings, mouth and ear muscles resulted when the arterial blood was shut off but was followed by a dilatation. When blood was again allowed to flow, an initial dilatation followed, but a constriction resulted.

The second paper, "Ueber den Einfluss der Blutströmung in den grossen Gefässen des Halses auf die Warme des Ohrs beim Kaninchen und ihr Verhältniss zu den Wärmeveränderungen, welche durch Lahmung und Reizung des Sympathikus bedingt werden," was published in von H. Moleschott's *Untersuchungen Zur Naturlehre des Menschen und Thiere.*[10]

The most important of his researches of this period are presented in an article entitled: "Untersuchungen über Ursprung und Wesen der fallsuchtartigen Zuckungen bei der Verblutung, sowie der Fallsucht überhaupt," and published in the third volume of Moleschott's publication. This work was done with the help of Tenner and Donders. They showed first that this condition was not so much the change of the volume of the blood stream as the change produced in the nervous system due to the lack of food, resulting either from lack of blood or from a congestion with impure blood. They succeeded in performing an operation to expose all the vessels to the brain and to clamp any or all of them. Thus they were able to produce epileptoid·convulsions at will and as often as desired. In the second place they attempted to locate the seat of such convulsions. They removed the cortex and thalamus and then the mid-brain. They found that all convulsions did not stop until the posterior parts of the corpora quadrigemina were removed and they concluded that this was the place where the seat of convulsions was located.

This work of Kussmaul is thought to have been the reason for his advance and recognition at Heidelberg. Another paper which added to this recognition was: "Ueber die Totenstarre und die ihr nahe verwandten Zustande der Muskelstarre, mit besonderer Rücksicht auf die Staatsarzneikunde."[11] During the summer of 1856 Kussmaul lectured twice a week on the subject of Death. He showed that rigor mortis was the result of chemical change within the muscle and not necessarily due to the death of the nerve, as was commonly believed. He also showed that the approximate time of death could be determined by the state of rigor mortis. It was as a result of this work that Kussmaul was promoted, in November, 1857, to an assistant professorship. In connection with this promotion Kussmaul delivered an address before the Naturhistorischen-medicinischen Verein zu Heidelberg on the deadening effect of chloroform on the muscles when injected into the leg arteries. He showed that chloroform produces a contraction of the muscles and a stiffening of the legs, similar to that of rigor mortis. In connection with his course in toxicology he noted the type of rigor mortis which resulted from lethal doses of various drugs in rabbits. He observed that rigor mortis in animals killed with the extract of poisoned mushrooms (*agaricus muscarinus L.*) set in two minutes after death and disappeared completely three and a half hours afterward.

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[9] Wurzburg, 1855.

[10] Frankfurt, 1857, vol. 1, 90.

[11] *Prag. Vierteljahrsschrift*, 1856, XIII, 2.

On January 25, 1858, at the session of the Naturhistorischen-medicinischen Verein, Kussmaul demonstrated an ovarian duct pregnancy. The specimen had been obtained from a thirty-year old woman who had died as a result of a hemorrhage caused by the rupture of the placenta. The placenta was located in the left oviduct near its entrance into the uterus. The left ovary appeared passive while the right ovary contained two corpora lutea. He concluded that the ova entered the right oviduct, crossed the uterus and located in the left oviduct. He delivered another address on May 31, 1858, entitled "Ueber die einhörnige Gebärmutter ohne und mit verkümmertem Nebenhorne."

A paper entitled "Nachempfängniss" was given on January 17, 1859. During the same year he published a book, entitled "Von dem Mangel, der Vorkümmerung und Verdopplung der Gebärmutter, von der Nachempfängniss und der Ueberwanderung des Eies." This book has been a valuable text for the obstetrician.

At the meeting of natural scientists at Bonn in 1857, Kussmaul's work attracted great attention. It was there that Gerlach became interested in him, which interest resulted in Kussmaul's call to the clinic at Erlangen, in 1859. At the occasion of his entrance into the faculty of Erlangen, Kussmaul read a paper entitled "Untersuchungen über das Seelenleben des neugeborenen Menschen." This was published in book form in 1859 and was followed by two later editions, one in 1885 and the last in 1896.

At Erlangen Kussmaul had occasion to study numerous cases of mercurial poisoning which occurred at the mirror factory. Mercury poisoning and syphilis were often confused, and some believed that syphilis was the same as mercury poisoning. Kussmaul, in his "Untersuchungen über den constitutionellen Mercurialismus und sein Verhältniss zur constitutionellen Syphilis,"[12] shows that mercury poisoning and syphilis are two entirely different diseases.

In 1863, under the heading of "Beitrage zur Anatomie und Pathologie des Harnapparats," Kussmaul presented eight short articles.[13] They were: (1) Regarding the diagnosis of tuberculosis of the urinary passages; (2) "Markschwamm" of the left kidney; (3) Hydronephrosis as a result of a crossing of the right ureter with an accessary renal artery; (4) Pyonephrosis with an unusually large kidney; (5) A case of "Morbus Brightii"; (6) A study of "Paraplegia urinaria"; (7) Microscopical findings in the urine in a case of jaundice; (8) A typical case of Addisonian disease.

Later[14] Kussmaul published an article entitled "Rheumatismus articularis acutus mit Tuberculosis miliaris—Wanderung eines verschluckten Dorns in das Herz und ein freies Concrement in Herzbeutel." In this he teaches that the symptom complex then known as Rheumatismus cerebralis can be produced by a tubercular basilar meningitis. The same patient on whom these observations were made accidentally swallowed a thorn about a year and a half before his death. He complained of pain in the precordial region for a long time. At autopsy the thorn was found in the heart. On its way from the esophagus to the heart an infection must have been caused in the pericardial chamber, which resulted in a free pericardial stone. This was the first account of such a structure. The thorn itself had found its way into the interventricular septum and progressed toward the right into the heart cavity, where the greater part of it was exposed to the blood stream. A white fibrin mass surrounded it.

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[12] Wurzburg, 1861.

[13] *Wurzburger med. Ztschr.*, vol. IV.

[14] *Ibid.*, vol. V, 61.

In 1863, Kussmaul returned to his home state, Baden, where he accepted the chair of internal medicine at the University of Freiburg. His inaugural address, on "Die Entwicklungsphasen der exacten Medicin," was timely since it emphasized the necessity of systematizing and stabilizing the methods in internal medicine, which had been almost entirely ignored by the skeptical teachings of Skoda.

Kussmaul's first publication in Freiburg, "Zur Diagnose der Embolie der Arteriae mesentericae,"[15] appeared in 1864. A diagnosis of this type was new in his time. In the article he states how he could tell whether the embolus was in the superior or inferior mesenteric artery.

In numbers 50 and 51 of the *Deutsche Klinik* he reports two cases of spontaneous gradual closing of the large arteries of the neck.

His paper on "Schnupfen der Säuglinge" was published in 1856.[16] He shows that catarrh in children of one year or under is much more serious than in adults because of the position of the tongue. The sucking position of the tongue in children makes breathing through the mouth almost impossible. Another article of import, "Ueber angeborne Enge und Verschluss der Lungenarterienbahn," was published in 1866.[17] In this paper he classified a large number of related cases which cause pulmonary insufficiency, which had never before been classified.

In the first volume of the *Deutsches Archiv für klinische Medicin*, Kussmaul and Maier described a disease of arteries (periarteritis nodosa), which had not been described theretofore. A second paper by the same authors appeared in the same journal,[18] entitled "Zur pathologischen Anatomie des chronischen Saturnismus." This paper was based on careful histological observations on the organs of a painter who died from lead poisoning. The poisoning resulted in an atrophy of the digestive glands, which hindered proper digestion; atrophy of the villi, which prevented proper absorption; and injury to the sympathetic ganglia, which resulted in a spasticity of the intestinal muscles.

Kussmaul published three papers on liver abscesses: "Ungewöhnlich grosse vereiterte Echinococcengeschwulst der Leber."[19] (In this case recovery resulted but a permanent fistula remained as a result of the puncture); "Zwei seltene Beobachtungen von tödtlich verlaufenen Leberabssessen"[20]; and "Eitrige Blennorrhoe mit sackiger Erweiterung der Gallengänge der Leber zu zahllosen abssess ähnlichen Hohlräumen, hervorgerufen durch ein Concrement im Ductus hepaticus."[21]

Two papers on thoracocentesis in cases of pleuritis appeared from Kussmaul's clinic: the first, by himself, on "Sechzehn Beobachtungen von Thoracocentesis bei Pleuritis, Empyem und Pyopneumothorax,"[22] and the other by Dr. F. Vogel, entitled "Eine neue Methode zur Entleerung des Eiters nach Thoracocentese."[23] They inserted a double tube or U-tube into the pleural cavity. Rubber tubes were connected with each projecting tube. The one was connected with a pressure bottle containing a mild disinfecting solution which was allowed to flow into the pleural cavity, and the other led into a vessel which received the fluid from the pleural cavity. Kussmaul claimed that this method was much more effective than drainage from a single tube.

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[15] *Wurz. med. Ztschr.*, vol. v, 210.

[16] *Ztschr. f. rationelle Med., Heidelb.* xxiii, 225.

[17] *Ibid.*, xxvi, 99.

[18] *Deutsche. Arch. f. klin. Med., Leipz.*, 1872, ix, 283.

[19] *Berl. klin. Wchnschr.*, 1867, No. 52, 543.

[20] *Ibid.*, 1868, No. 12, 129.

[21] *Ibid.*, 1868, Vo. 20.

[22] *Deutsches Arch. f. klin. Med.*, Leipz., 1868, iv.

[23] *Berl. klin. Wchnschr.*, 1869, No. 46 and 47.

In 1868 he published a paper entitled "Epidemie durch Vergiftung mit Schwartenmagen in Lahr und Umgebung."[24]

The work which brought Kussmaul great popularity at the time was the use of the stomach tube in cases of enlargement of the stomach as a result of pyloric constricture or closure. He reasoned that the pyloric constriction resulted from the excessive stimulation of the sympathetic nerves by the sour content of the stomach. He cites a case where cure was effected by emptying the stomach daily and washing it with bicarbonate of soda. In long-standing cases with complete or almost complete closure he was unable to effect a cure. That Kussmaul was not the originator of the stomach pump, as the Germans claim, is discussed earlier in this paper. The splendid results, however, and the analysis of when the stomach tube should be used and when it should not be used, which Kussmaul has given, have without question been instrumental in bringing the method into more general use. Kussmaul realized that many stomach disorders, and especially pyloric closures, could not be cured by the use of the stomach pump alone, but he suggests:

> It may be that the keener intellects of future generations will undertake in such case to resort to gastrotomy, stomach fistula, enlargement of the pyloric opening by means of a knife or tube, in order to obtain radical results. Who would dare to answer this question today? I fear that even this suggestion may elicit secret or open ridicule.

Closely associated with his work on the stomach stand his observations of the esophagus and stomach with the esophagoscope and gastroscope. No paper was published on this subject although he read several papers on it before scientific organizations.

He writes[25]:

> During the winter session of our association, 1867–1868, I gave a talk on the local therapy of the oesophagus and stomach, partly with reference to this new method of cure [the use of the stomach pump] and partly in the form of a demonstration of the oesophagoscope and gastroscope, on which subject I shall write later.

This latter wish was never fulfilled. The statement, however, is the first on record relative to the successful use of the gastroscope.

Dr. Gustav Killian in his history of the esophagoscope and gastroscope gives an interesting account of Kussmaul's place in the history of the use of this instrument. Killian had access to the instrument which Kussmaul used and to the esophagoscopic drawings which Kussmaul had made. Both of these are shown in the accompanying pictures. He also corresponded with Dr. Kussmaul freely and thus obtained first-hand information regarding this subject. According to Killian, the story of Kussmaul's relation to the history of gastroscopy is as follows: Optical instruments, which might be called endoscopes, date back to Bozzini (1805), Buchanan (1825), Segalas (1826), Kramer (1833), Bonafont (1834), and James Gregory (1861). On November 29, 1853, Desormeaux demonstrated a urethroscope which he called the endoscope. He used this instrument exclusively for examining the urethra and bladder and suggested its use in rectal and vaginal examinations. In 1865, Cruise[26] suggested that it might be used in the examination of the esophagus and stomach. In 1868, Kussmaul began his studies on the digestive tract. In order to learn something about the endoscope Kussmaul sent his assistant, Dr. Honsell, to Desormeaux at Paris to get one. Killian states that this instrument may still be found complete in the clinic at Freiburg. Dr. Kussmaul used it in studying the esophagus with success. He was able to see with great clearness a carcinoma at the upper end of the esophagus in one of his patients. It happened that at the time a man who was able to swallow a small sword gave demonstrations at Freiburg. Kussmaul brought this sword-eater into his clinic and had him swallow the long tube of the endoscope. Kussmaul, thus, is the first on record to use a gastroscope. The light, however, being so far removed from the stomach, was not sufficient to make the observation of practical value.

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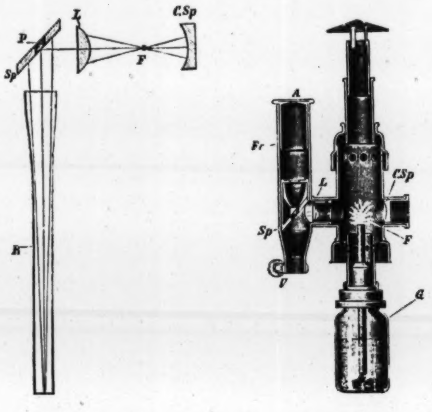
[24] *Deutsche. Arch. f. klin. Med.*, Leipz., 1868, IV.

[25] *Deutsche. Arch. f. klin. Med.*, Leipz., 1869, VI, 456.

[26] *Dublin Anat. J. Med. Sc.*, 1865, XXXIX.

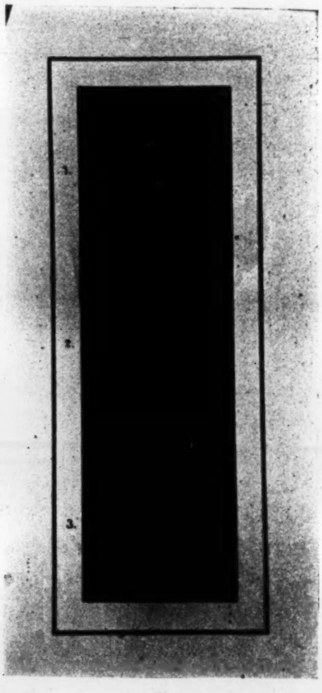
Of historical interest are Kussmaul's twenty popular letters on "Menschenpocken und Kuhpockenimpfung" which were published in the *Freiburger Zeitung* during the winter of 1869. In such an interesting and explanatory manner did he write these letters that a much greater tolerance toward vaccination resulted, and the present low death-rate from smallpox cases in Germany is attributed to this educational campaign.



The Esophageoscope which Kussmaul used. (Désormeaux's Endoskop nach Originalabbildungen. *a: F*, Flamme; *C.Sp*, Concavspiegel; *L*, Planconvexlinse; *Sp*, Planspiegel bei *P* in der Mitte durchbohrt; *R*, Röhrenspeculum. *b: G*, Lampe, in fester Verbindung mit dem Concavspiegel (*C.Sp*) und der Sammellinse (*L*); um die optische Achse dieses Systems ist das Fernrohr (*Fr*) mit dem centraldurchbohrten, ebenen Reflexspiegel (*Sp*) drehbar; *V*, Befestigsstelle der Röhrenspecula.)

During the years 1868–1872, Kussmaul reviewed the subject of "Diseases of the Nervous System" in the "Virchow-Hirsch'schen Jahresberichten." In addition he published four other articles. Two of these appeared in the *Berliner klinische Wochenschrift;* the first, "Ueber rheumatischen Tetanus und rheumatischtonische Krämpfe, welche mit Albuminurie verlaufen,"[27] and the second, "Zur Lehre der Tetanie."[28] The third was "Traumatisch-rheumatischen Tetanus in einer bis jetzt wenig beachteten Abortivorm"[29] and the fourth, a masterpiece entitled "Ueber die fortschreitende Bulbärparalyse und ihr Verhältniss zur progressiven Muskelatrophie."[30]

In his article "Ueber schwielige Mediastino-Pericarditis und den paradoxen Puls,"[31] Kussmaul describes various types of pericarditis. Among his cases, he reports three were due to mediastinal adhesions. The arch of the aorta was compressed at each inspiration, which resulted in a diminution or omission of the pulse while the heartbeat was regular. With each expiration the pulse was normal. Kussmaul writes: "I propose to call this the paradoxical pulse."



Kussmaul's Drawings of Esophageoscopical Pictures.

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[27] 1871, No. 41–44.

[28] 1872, No. 37.

[29] *Deutsches Arch. f. klin. Med.*, Leipz., 11.

[30] *Samml. Klin. Vortr.*, No. 62.

[31] *Berl. klin. Wchnschr.*, 1873, No. 37, 38, 39.

An earlier observation of such a pulse was made by Griesinger and described by Widenmann in 1856.

The last of his publications from Freiburg, "Zur Lehre vom Diabetes Mellitus," appeared in 1874.[32] He described the final clinical picture but was at a loss to know what was the cause of these symptoms. In this connection he studied the effect of acetone on rabbits and on man. He found its action not as intense as chloroform or ether but stronger than alcohol. He noted that it is, to a considerable extent, exhaled unchanged. In man he found that large doses could be given without poisoning. He, therefore, questioned the view that the final symptoms could be regarded as acetone poisoning. He does, however, say that the constant presence of acetone may produce acute symptoms, just as in chronic alcoholism acute "delirium tremens" may appear suddenly.

In 1876 Kussmaul was called to Strassburg. His first literary product from Strassburg was a book: "Die Störungen der Sprache."[33] This is considered by many the most masterly of all his productions.

During his ten-year stay at Strassburg, Kussmaul's activities resulted in two further papers on the stomach, published in 1879 and 1880; three on neuropsychiatric subjects, 1880, 1882 and 1887; and one on fibro-purulent infection of Stenson's duct. He also published two papers, one in memory of Dr. Benedict Stilling (1879) and the other in memory of Nikolaus Friedreich (1883).

In 1888 Kussmaul returned to Heidelberg as Professor Emeritus. His intention was to give his overworked body the long-looked-for rest. He obtained a very comfortable house but not the desired retirement from practice. People from all parts of Germany who suffered from chronic ailments came to him, and he did not have the heart to turn them away. Oftentimes his work kept him from his prescribed walks, diversions and meals.

In spite of this work he found time to continue his literary activities. In 1897 he wrote a booklet: "Ueber den kommissarischen Entwurf zur Revision der deutschen medizinische Prüfungsordung."[34]

Kussmaul's spare time at Heidelberg was spent in writing his exceptionally fine autobiography, entitled "Jugenderinnerung eines alten Arztes."[35] A continuation of this autobiography, entitled "Aus Meiner Dozentenzeit," was never completed, but was published after his death by Vinzenz Czerny. His last strictly scientific publication appeared in 1900: "Ueber lange fortgesetzte Anwending kleiner Digitalisgaben."[36] In January, 1902, several months before his death, his last article appeared, entitled "Ein Dreigestirn grosser Naturforscher an der Heidelberger Universität im 19 Jahrundert."[37]

Kussmaul was very fond of poetry and in his earlier years enjoyed writing it. During his academic life he found no time to exercise his poetic talent. Even his earlier poems had been mislaid. When, therefore, in his later years, he found his poems among old books, he was greatly rejoiced and had them published under the title of "Poetische Jugendsünden des Dr. Oribasius," and gave them as Christmas gifts to his friends in 1893.

While Kussmaul did not write many poems in his old days, the Foreword to his Autobiography shows that he still had the ability:

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[32] *Deutsches Arch. f. klin. Med.*, Leipz., 1874, XIV.

[33] Leipzig, 1877.

[34] Heidelberg, 1897.

[35] Stuttgart, 1899.

[36] *Therap. d. Gegenwart.*, January, 1900, p. 1.

[37] *Deutsch. Rev.*, Stuttgart, 1902.

a country doctor. The winter of 1853 was mild until February, when severe weather set in. Sickness was very prevalent throughout the winter, but increased tremendously with the onset of ice and snow. Kussmaul was unable to attend to all of the cases. Not a night passed in which he was not called from his bed. He could no longer eat his meals at regular hours and did not eat enough. Already in an overtaxed condition, he accepted a consultation call to a neighboring town. The trip was made on horseback. He started before sunrise and returned late at night. On the way home he had a feeling in the soles of his feet as though he was walking on rough felt. It was a skin paralysis, but Kussmaul did not realize its serious indication. He had hardly retired when he was called on a case which kept him the entire night. When he returned home the sun had arisen and new work was awaiting him. Night came again and he hoped to gain the desired rest, but he had hardly retired when he again was called to a case which kept him all night. The new day had its work in store. Immediately after breakfast he made a trip by sled to a neighboring town. Snow was falling fast and by the time he reached his destination he was wet to the skin. On the way back the sled tipped and he fell in the deep snow. He could not retire at once on returning home and after he did retire did not get warm until midnight. He had hardly fallen asleep when he felt severe pains under his left scapula. He feared pleurisy. A fever complicated his condition and he spent a sleepless night. Toward morning when he was about to go to sleep a messenger came to remind him that he had promised to perform an operation on hairlip. There was no other way; he kept his promise and completed his operation successfully. The little girl on whom the operation was performed developed a beautiful face. When Kussmaul returned home he had to write prescriptions for several farmers before he could retire.

His condition had reached a serious state and could be readily diagnosed. His legs were weak and cramps occurred frequently. He could hardly stand. His feet were senseless and his bladder was paralyzed. Pain was intense. Spinal meningitis was the diagnosis. It was a terrible prospect that he faced. Either the infection would ascend, paralyzing his arms and finally his respiratory mechanism, or else it would halt in the lower parts, causing a permanent paralysis of the lower extremities which would make him unfit for his occupation. During the first days he took strong wine and washed his legs with warm water, but his condition did not improve. At the end of the first week worry and anxiety led him to employ a method which he did not dare to use with his patients. He took one grain doses of tartar emetic at two day intervals. Unusual vomiting ensued. His conception of meningitis was erroneous. He thought a fluid had formed in the meninges similar to that found in the joints during acute articular rheumatism. He hoped that by excessive vomiting this fluid would be drawn from the spinal canal.

This method brought results: after the third dose the paralysis of the bladder subsided. The paralysis of his legs, however, subsided very slowly. It was the middle of April before he could leave his bed and it was a number of years before he could use his legs normally.

As soon as hope for complete recovery was in sight Kussmaul decided to give up his country practice and prepare for the academic life which he had always hoped to enter. He had saved enough money, so he thought, to study for several years, get his degree, and then enter teaching. Seldom does one find a practicing physician give up his practice to enter academic life. Kussmaul did not realize the cost of this change and after two years was almost forced to reenter private practice. Had it not been for the encouragement of his wife during this trying financial period of his life, Kussmaul would never have been able to live the productive academic life which he did.

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[37] *Deutsch. Rev.*, Stuttgart, 1902.

That this Foreword conveys the mood of Dr. Kussmaul at the time of preparing his autobiography can be appreciated when we remember that his wife died shortly before he began writing it.

On February 22, 1902, Kussmaul celebrated his eightieth birthday. For this occasion clinical men and physicians from all parts of Germany, who had associated with Kussmaul, decided to dedicate Volume LXXIII of the *Deutsches Archiv für klinische Medicin* to him. This volume contains contributions from thirty-three different workers, and all of the articles have some reference to one or the other of Dr. Kussmaul's own researches. On this occasion the municipality of Heidelberg presented him with the freedom of the city, and the Grand Duke of Baden granted him the Title of Real Privy Councilor.

In the early morning of May 28, 1902, Dr. Adolf Kussmaul, after a half hour's struggle with death, was numbered in the toll of the Grim Reaper. Coronary sclerosis was the cause of his death. Kussmaul was active and retained his mental vigor to the last hours of his life, although the burden of eighty years rested heavily upon him at times. In his death all those who knew him lost a friend of kindly and amiable disposition and the medical world a leader and investigator of high rank.

KUSSMAUL'S LITERARY WORKS

A. Akademische Preisschrift

1845. Die Farbenerscheinungen im Grunde des menschlichen Auges. Heidelb.

B. Als praktischer Arzt

1847. Ein Fall von spontanen, anhaltenden Hamorrhagien in den Bauchfellsack, mit Bildung von Geschwulsten. *Ztschr. f. rat. Med.*, Heidelberg, VI, 92–101.

1852. Zur pathologischen Anatomie des Rheumatismus ac. articulorum. *Arch. f. physiol. Heilk.*, Stuttg., XI, No. 4. Zwei Fälle von Polyostitis bei Knaben, einen Fall mit Ausgang in Nekrose der Knochen und Genesung, der andere mit Perikarditis und Ausgant mit Tod. (Wohl die erste Beschreibung der akuten Osteomyelitis, da Chassaignacs Memoire sur l'osteomyelite erst 1854 erschienen ist. Czerny.)

1853. Belege zur Kontagiosität der Ruhr nebst einigen Bemerkungen über ihre Therapie. *Mitth. d. badisch. ärztl. Ver.*, Karlsruhe, VII, No. 2.

1853. Stomatitis septica. *Ibid.*, VII, No. 8.

1853. Erfahrungen über den Abdominaltyphus in der Umgebung von Kandern in den Jahren 1850–1853. *Ibid.*, VII, No. 13.

1854. Bemerkungen über die Bedeutung des Nasenblutens, besonders im Typhus. *Ibid.*, VIII, No. 23.

C. Doktordissertation

1855. Untersuchungen über den Einfluss, welchen die Blutströmung auf die Bewegungen der Iris und anderer Theile des Kopfes ausübt. Diss. inaug. *Verhandl. d. phys.-med. Gesellsch. in Würzb.* VI, 1–42.

D. Als Lehrer der Heidelberger Hochschule

1856. Über die Totenstarre und die ihr nahe verwandten Zustande von Muskelstarre mit besonderer Rücksicht auf die Staatsarzneikunde. *Prag. Vierteljahrsschr.*, XIII, 2.

1857. Über den Einfluss der Blutströmung in den grossen Gefässen des Halses auf die Warme des Ohrs beim Kaninchen und ihr Verhältniss zu den Warmeveranderungen, welche durch Lahmung und Reizung des Sympathikus bedingt werden. *Untersuch. z. Naturl. d. Mensch. u. d. Thiere.* I, 90.

1857. Untersuchungen über Ursprung und Wesen der fallsucthartigen Zuckungen bei der Verblutung. With A. Tenner. *Ibid.*, III, 1, and Frankfurt a. M.

1857. Ein Fall von wahrscheinlicher Morphinvergiftung. *Deutsche Ztschr. f. d. Staatsarzneikunde.* IX, 2.

1857. Über einige Bestandteile des Fliegenschwamms. With Dr. Borntraeger. *Verhadl. d. naturh.-med. Ver. zu Heidelb.* I, 18.

1858. Über die Zerreissung der inneren Haute der Halsarterien bei Erhangten. *Virchow's Arch. f. path. Anat.* [etc.], Berl., XIII, 60.

1858. Über die Ertotung der Gliedmassen durch Einspritzung von Chloroform in die Schlagadern. *Ibid.*, XIII, 289.

1859. Von dem Mangel, der Verkümmerung und Verdopplung der Gebärmutter, von der Nachempfängniss und der Ueberwanderung des Eies. Würzburg. 8vo, viii + 384 pp.

1859. Untersuchungen über das Seelenleben des neugeborenen Menschen. Heidelberg.

1859. Zwei Fälle von Paraplegie mit tödtlichen Ausgange ohne anatomisch nachweisbare oder toxische Ursache. Programm zum Eintritt in die mediz. Facultät der Universität zu Erlangen. Heidelberg.

E. Als innerer Kliniker in Erlangen

1861. Untersuchungen über den constitutionellen Mercurialismus und sein Verhältniss zur constitutionellen Syphilis. Würzburg. 433 pp.

1862. Über geschlechtliche Frühreife. *Würzb. med. Ztschr.*, III, 321.

1862. Weitere Beitrage zur Lehre von der Uberwanderung des menschlichen Eies. *Monatschr. f. Geburtsk.*, XX, No. 4, 295.

1863. Beitrage zur Anatomie und Pathologie des Harnapparats. *Würz. med. Ztschr.*, IV, 24.
   1. Über die Diagnose der Phthisis tuberculosa der Harnwege.
   2. Markschwamm der linken Niere bei einem 3½ J. alten Knaben.
   3. Hydronephrosis durch Kreuzung des rechten Ureter mit einer uberzahligen Nierenarterie.
   4. Hydronephrosis mit ungewohnlicher Ausdehnung der Niere.
   5. Morbus Brightii mit ungewohnlich langer, mehr als zehnjahriger Dauer.
   6. Zur Lehre von der Paraplegia urinaria.
   7. Zellen mit kernahnlichen und schleimkorperahnlichen Gebilden in ihrem Inneren bei Blasenkatarrh einer Ikterischen. Gallenfarbstoff-Kristalle in diesen Zellen und den Schleimkorperchen des Sediments. Anhang: Morbus Addisonii.

1864. Rheumatismus articularis mit Tuberculosis miliaris. Wanderung eines verschluckten Dorns in das Herz und ein freies Konkrement im Herzbeutel. *Ibid.*, V, 61.

F. Als innerer Kliniker in Freiburg i. Br.

1864. Zur Diagnose der Embolie der Arteriae mesentericae. *Ibid.*, V, 210.

1865. Über den Schnupfen der Säuglinge. *Ztschr. f. rat. Med.*, Heidelberg, s. 3, XXIII, 225. Auf Grund zahlreicher Untersuchungen seines Assistenzarztes, Dr. Honsell; an Sauglingen.

1865. Über angeborne Enge und Verschluss der Lungenarterien-Bahn. *Ibid.*, XXVI, 99–179, with 3 plates. Also: *Ber. d. naturhist. Gesellsch. z. Freiburg.*, III, No. 3 and 4.

1866. Über eine bisher nicht beschriebene, eigentumbliche Arterien-erkrankung (Periarteritis nodosa), die mit Morbus Brightii und rapid fortschreitender allgemeiner Muskellahmung einhergeht. With Prof. Rud. Maier. *Deutsches Arch. f. klin. Med.*, Leipz, I, No. 484.

1867. Die Aschenbestandteile der Lungen und Bronchialdrusen, nach Analysen von Dr. phil. E. W. Schmidt. *Ibid.*, II, No. 5, 89.

1867. Ungewohnlich grosse vereiterte Echinokokken-Geschwulst der Leber, durch Funktion geheilt mit Zurücklassung einer Fiftel. *Berl. klin. Wchnschr.*, No. 52, 543.

1868. Zwei seltene Beobachtungen von todtlich verlaufenen Leberabssessen. *Ibid.*, No. 12, 129.
   1. Ein Leberlungenabssess, wahrscheinlich aus einer Echinokokken-Enste hervorgegangen und wie Lungenphthise verlaufen.
   2. Pielfache Leberabssesse, aus eitriger Peripylephlebitis hervorgegangen, mit Abscessen der Submucosa intestini coeci et coli und zwischen den Platten des Mesenterium. *Cf.*, Maier, R. *Arch. d. Heilk. v. Wagner*, 1867, No. 1, 30.

1868. Eitrige Blennorrhoe mit sackiger Erweiterung der Gallengänge der Leber zu zahllosen abscessähnlichen Hohlräumen, hervorgerufen durch ein Konkrement in Ductus hepaticus. *Berl. klin. Wchnschr.*, No. 20, 213.

1868. Sechzehn Beobachtungen von Thorakocentesis bei Pleuritis, Empyem und Pyopneumothorax. *Deutsches Arch. f. klin. Med.*, Leipz., IV, No. 1, 1; 173.

1868. Epidemie durch Vergiftung mit Schwartenmagen in Lahr und Umgebung. *Ibid.*, No. 5 and 6, 455.

1868. Am 21. Juli Vortrag "über Magenspiegelung" in der naturforschenden Gesellschaft zu Freiburg, der in deren Berichten angeführt, aber leider nicht ausführlich mitgeteilt ist.

1869. Ueber die Behandlung der Magenerweiterung durch eine neue Methode (mittelst der Magenpumpe). Freiburger Prorektorats-Programm zur Geburtstagsfeier des Grossherzogs Friedrich v. Baden. Im wesentlichen bereits vorgetragen 1867 in der 41. Versammlung deutscher Naturforscher und Ärzte in Frankfurt a. M. Abgedruckt im *Deutsches Arch. f. klin. Med.*, Leipz., VI, 455.

1870. Zwanzig Briefe über Menschenpocken und Kuhpocken-Impfung. Gemeinverständliche Darstellung der Impffrage. Freiburg i. B., viii + 117 pp.

1871. Ueber rhäumatischen Tetanus und rheumatische tonische Krämpfe, welche mit Albuminurie verlaufen. *Berl. klin. Wchnschr.*, VIII, 485, 497, 513, 525.

1872. Zur Lehre von der Tetanie. *Ibid.*, IX, 441.

1872. Zwei Fälle von spontaner allmählicher Verschliessung grosser Halsarterienstämme. *Deutsche Klinik.*, Berl. & Wien, No. 50, 51.

1872. Zur pathologischen Anatomie des chronischen Saturnismus. Gemeinsam mit Rud. Maier.

Deutsches Arch. f. klin. Med., Leipz., ix, 283.

1873. Ueber die fortschreitende Bulbärparalyse und ihr Verhältniss zur progressiven Muskelatrophie. *Volkmann's Samml. klin. Vortr.*, Leipz. (Innere Med.) No. 62, 1637–1674. *Cf.* Maier, R. Ein Fall von fortschreitender Bulbärparalyse. *Virchow's Arch. f. path. Anat.* [etc.], Berl., lxi.

1873. Ueber schwielige Mediastino-Pericarditis und den paradoxen Puls. *Berl. klin. Wchnschr.*, x, 433, 445, 461.

1873. Über eine abortive Form des Tetanus. *Deutsches Arch. f. klin. Med.*, Leipz., xi, 1.

1874. Zur Lehre vom Diabetes mellitus. Über eine eigentümliche Todesart bei Diabetischen. Über Acetonamie. Über Glyzerin behandlung des Diabetes und Einspritzungen von Diastase ins. Blut bei dieser Krankheit. *Ibid.*, xiv, 1.

1877. Die Störungen der Sprache. Versuch einer Pathologie der Sprache. Supplement to Ziemssen. Handbuch der spez. Pathol. u. Therapie, Vol. xii. Ed. 2. 1881, Ed. 3, 1885, 299 pp.

G. ALS INNERER KLINIKER IN STRASSBURG I. E.

1878. Über direkte Faradisierung des Magens. *Arch. f. Psychiat.*, Berl., viii, 205.

1879. Anfallsweise auftretende Speichelgeschmulst infolge von chronischer eitrigfibrinoser Entzundung des Spenonschen Ganga (Sialodchitis Stenoniana fibrinosa chronica). *Berl. klin. Wchnschr.*, xvi, 209.

1879. Dr. Benedikt Stilling, Gedächtnisrede, gehalten auf der 52. Versammlung deutsche Naturforscher und Arzte zu Baden-Baden am 18. Sept. 1879. Selbstandig erschienen mit zahlreichen Noten der Professoren Dr. Goltz, Dr. Waldeyer und von Dr. Kussmaul selbst. Strassburg.

1880. Ein Fall von multiplen Gliomen in der Cerebrospinalaze unterhalb der Grosshirnschenkel. *Arch. f. Psychiat.*, Berl., xi, 261.

1880. Die peristaltische Unruhe des Magens, nebst Bemerkungen über Tiefstand und Erweiterung desselben, das Klatschgeräusch und Galle im Magen. *Samml. klin. Vortr.*, No. 181, 1673–1674.

1882. Über die Regulierung der Lautsprache durch den Tastsinn. *Arch. f. Psychiat.*, Berl., xiii, 712.

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MEDICAL NUMISMATICS*

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IT is said that Billroth, in looking over a collection of medical medals, observed that "hardly a single one of them had been struck off to commemorate anything more than respectable mediocrity." Like all epigrams and stories of the *ben trovato* type, the assertion has a shade of exaggeration and an element of truth. The earlier medical medals tended to commemorate things rather than people, later on, physicians prominent on account of their connection with institutions and societies, finally physicians recognized as eminent by reason of their contributions to scientific medicine. The same tendency is noticeable throughout the history of medicine with regard to medical authorship. Before Hippocrates, recorded medicine, whether Assyro-Babylonian, Egyptian, Cretan or Mycenaean, was the work of priestly castes or of medical corporations or guilds, and while we know the names of various practicing physicians of Egypt or Babylon, the papyric and cuneiform medical literature is invariably anonymous. It is through the individualizing tendencies of Greek medicine that the author begins to appear. The same thing is true of the medicine of ancient India, China and Japan. The existence of such an encyclopedia as that of Celsus signalizes a tendency which was to become a fixture during the long period of the Dark and Middle Ages; the author begins to disappear and only the name of the compiler, editor or publisher remains. Medical books begin to appear again under the authors' names in the fifteenth century. During the four centuries elapsing between 1395 and 1792, jetons or small flat medals, like coins, were struck off regularly by the old Academy of Medicine of Paris to commemorate the biennial election of each new Dean of the Paris Medical Faculty, and copies of these jetons, in silver or bronze, were presented to all the members of the Faculty. The Dean was not a professor in the Faculty but its chief administrative officer, hence a prominent rather than an eminent figure in the history of early French medicine. The Academy of Medicine (Paris) possesses 108 of these rare pieces. The numismatic collection of the Army Medical Museum (Washington) has ninety-one. The last to be struck off was that of Claude Bourru, who was Dean for three successive terms (1788–1793). When, in 1793, the scientific societies, medical schools and corporated institutions of France were swept away by the Revolution, the jetons disappeared with the Academy.[1] Any one who went through the formality of the burlesque examinations recorded by Wickersheimer could now be qualified as a practitioner of medicine or surgery.[2] But Napoleon soon found that such quacks and humbugs would be poor material for the medical personnel of his armies. He therefore established three "Écoles de santé," or schools of military medicine, at Paris, Montpellier and Strassburg, in 1795. The Academy of Medicine, however, remained unnoticed until 1823, when it was reestablished under Charles x. The time-honored custom of striking of jetons of Deans of the Faculty died, however, with the old Academy. But if we examine Kluyskens' volumes on the commemoration of men eminent in science and art by numismatic devices

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* Substance of remarks made at a meeting of the Historical Section, College of Physicians of Philadelphia, on February 16, 1926. Published by permission of the Surgeon General, U. S. Army.

[1] Allemann, A. Jetons of the Old Paris Academy of Medicine, etc. ANN. MED. HISTORY, N. Y., 1917, I, 155–158.

[2] Wickersheimer, E. Un examen de médecine en l'an XII. *Paris Méd.*, 1912–1913, suppl., 749–751.

(1859), we find medals of comparatively recent vintage in honor of Bichat (1802), Blumenbach (1825, 1826), Boerhaave (1819), Bouillaud (1838), Brodie (1841), Cuvier (1820), Descartes (1819, 1822), Dupuytren (1821, 1833), Fernelius (1822), Fracastorius (1805), Gall (1805), C. F. von Graefe (1829), Haller (1821), Harvey (1823), Heim (1822), Hufeland (1833), Jenner (1801, 1803, 1811), Lavoisier (1821, 1844), Morgagni (1808), Orfila (1821), Palfyn (1858), Paré (1819), Rabelais (1818), Reil (1813), Scarpa (1819), Soemmerring (1828), Sydenham (1828), Tiedemann (1854), Vesalius (1810, 1820), Leonardo da Vinci (1817, 1825), with many others of much earlier date. The tendency of the Napoleonic period, like that of the Periclean, was individualistic. Physicians now began to come into their own. Soon we find streets of the city of Paris named after them. In 1808, the U. S. Mint at Philadelphia struck off two different obstetric medals in honor of Benjamin Rush, who was at that time still alive and treasurer of the institution.[3] The tendency has gone on apace, up to the elegant placques and medallions of eminent physicians which have become familiar to us through the work of the artists of the Paris Mint and of such sculptors as Tait McKenzie.

A good example of the time-honored custom of associating coins and medals with things and ideas rather than with people is to be found in the touch-pieces for scrofula, issued in the reigns of various monarchs, of which nine English specimens are now in the Army Medical Museum at Washington. These include three gold touch-pieces of James II, Charles II and Queen Anne, and silver pieces of James II, his son Prince James of Scotland, who, as Pretender to the crown was declared James III by Louis XIV of France, of the Young Chevalier, Charles Edward (as Charles III), and of Henry, Cardinal York (as Henry IX). Except in size, shape and substance, these coins are all alike: the obverse shows a ship sailing, with the name and attributes of the monarch as legend; the reverse shows St. Michael slaying the dragon, with the legend "Soli Deo Gloria." A plaster cast reproduction of a touch-piece of Elizabeth's reign, presented to the Museum by Sir William Osler, I am not able to show, on account of its extreme friability. These coins may be said to illustrate an earlier or primitive phase of English medicine, of which the *locus classicus* is in Macbeth[4]:

England. A room in the King's palace.

MALCOLM: Comes the King forth I pray you?
DOCTOR: Ay, Sir: there are a crew of wretched souls,
That stay his cure: their malady convinces
The great assay of art; but, at his touch,
Such sanctity hath Heaven given his hand,
They presently amend.
MALCOLM: I thank you Doctor.
Exit Doctor.
MACDUFF: What's the disease he means?
MALCOLM: Tis call'd the evil:
A most miraculous work in this good king;
Which often, since my here-remain in England,
I have seen him do. How he solicits Heaven,
Himself best knows; but strangely-visited people,
All swoln and ulcerous, pitiful to the eye,
The mere despair of surgery, he cures;
Hanging a golden stamp about their necks,
Put on with holy prayers: and 'tis spoken,
To the succeeding royalty he leaves
The healing benediction.

The subject of touching for scrofula has a curious history. The first record is that of Helgald, a monk of the eleventh century, who relates that, in France, Robert the Pious (996–1031) cured scrofula by touch. Guibert, Abbot of Nogent, records that Philip I of France (1061–1108) and his son Louis VI (1108–1137) also touched for *scrophas circa jugulum*, and the custom was maintained up to Louis XVI, and was revived at the coronation of Charles X (1824), when Dupuytren and Alibert presented 121 patients. In England, according to William of Malmesbury, the practice was begun by Edward the Confessor in 1066, but fell into disuse among the Norman Kings, to be revived by Henry II, Henry III and the three Edwards. It was then discontinued until the time of Henry VII, who began to touch in 1462, with an elaborate ceremonial and the minting of a special coin, the gold Angel, in 1465. This ritual, with the minting of touch-pieces and of medals, as tickets of admission, was kept up until the time of Queen Anne, who even touched Dr. Johnson for scrofula. The touch-pieces of the Young Pretender, Charles Edward, and of Henry, Cardinal of York, constituted the last sigh of the exiled Stuarts "over the water." Touching was discarded by George I. The history of touching for scrofula is given at length in the interesting book on King's Evil by Dr. Raymond Crawford (1911). The subject of touch-pieces has been handled in most exhaustive and scholarly manner by Miss Helen Farquhar of London, printed in four parts[5] with a recent supplement on the Maundy pieces (1925).

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[3] Storer, H. R. The medals of Benjamin Rush, obstetrician. *J. A. M. A.*, Chicago, 1889, XIII, 330–335.

[4] Act IV, sc. 3 (1606–7).

In 1851, Dr. L. J. Renauldin published a book containing biographical sketches of some sixty-one medical numismatists. Of these, the most remarkable in the earlier period was J. C. G. Moehsen (1722–1795), whose celebrated catalogue of a collection of medical medals in Berlin[6] is still a standard source of reference. In 1699, Bonanni had already catalogued the medals of the Papacy, some of which are of medical or hygienic significance.

Rudolphi made an index of medical medals in 1823, to which von Duisburg added several supplements (1862–1868). Other catalogues have been published by Leitzmann, Neumann, Rüppell, and others. In 1859, Hippolyte Kluyskens published two well-known volumes on medals dedicated to the memory of men celebrated in science and art. Dr. Horatio R. Storer catalogued all the medical medals known to him in a most exhaustive and painstaking monograph.[7] Perhaps the most remarkable books on medical numismatics of recent vintage are those on the pest and famine medals by Pfeiffer and Ruland,[8] "Death in Art" by Dr. F. Parkes Weber[9] and the above mentioned monograph of Miss Farquhar on the touch-pieces.[10]

Until recently the only Americans seriously interested in medical numismatics were the late Dr. George J. Fisher, of New York, the late Dr. William Lee of Washington, whose collections went to the Army Medical Museum, and the late Dr. Horatio R. Storer (1832–1922), of Newport, Rhode Island, whose collections will go to the Boston Medical Library. Of these, Dr. Storer was in every way the most remarkable. He was, in his lifetime, perhaps the ablest and most devoted medical numismatist in the world. His collection of medical coins and medals is unrivalled, in this country at least. His catalogue of medical medals, which he never lived to complete and the publication of which was discontinued by the *American Journal of Numismatics* after 1912, stands quite alone, is like nothing else of its kind in print. I well remember my extensive correspondence with this extraordinary old gentleman, who was then nearly ninety, and who expressed a lingering hope that the rest of his great manuscript catalogue might eventually be published by the Surgeon General's Office. If completed (from his collections), it would take its place with such monuments of industry as Hain's and Coppinger's catalogues of the incunabula or Smith's "Rara Arithmetica." To collect and bind the separate installments up to 1912 would be the first step to having the whole catalogue eventually reprinted in complete and final shape. In a sketch of the numismatic medical history of the United States, published in 1891,[11] Dr. Storer employs the following classification of medical medals:

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[5] *Brit. Numismatic J.*, Lond., 1919–1921, XII–XV.

[6] 2 vols., Berlin, 1773–1781.

[7] *Am. J. Numismatics*, 1887–1912 *passim.*

[8] Pestilentia in nummis. Weimar, 1880; ed. 2, Tübingen, 1882.

[9] Ed. 3, Lond., 1918.

[10] Lond., 1919–1921.

A. Personal medals.
B. Those of medical colleges, hospitals and professional societies.
C. Those commemorative of medical events.
D. Those signalizing epidemic disease.
E. Medico-ecclesiastical medals.
F. Tokens of pharmacists, dentists and irregular practitioners.

He then divides Class A (Personal medals) into:

1. Medals struck with sole reference to commemorating the individual.
2. Medals commemorating with the individual a medical college.
3. Medals commemorating with the individual a medical society.
4. Medals commemorating with the individual a hospital.
5. Medals conferred upon special physicians by a medical college, society, hospital or other organization for medical or surgical relief.
6. Medals conferred upon special physicians from other sources for medical (or collateral) reasons.
7. Medals conferred upon non-medical persons for medical reasons.
8. The medallic cards of physicians supposed to be in good standing.

In strict numismatic usage, as Storer says, true medals are those struck from dies, whence engraved medals, if included, should be specified as such. Nor should we exclude from our lists medals struck off in honor of biological or medical achievements by the non-medical, such as Leonardo, Goethe, John Howard, Agassiz, Pasteur, or of non-medical achievements by physicians, for example, explorations, work in geology, botany, zoology and other fields. In 1887, Dr. Storer, a gynecologist and obstetrician by profession, published a study of "The Medals, Jetons and Tokens illustrative of Midwifery and Diseases of Women"[12] and, in 1887–1898, a valuable catalogue of "The Medals, Jetons and Tokens illustrative of Sanitation,"[13] which he classifies as follows:

I. The general subject.
II. Water supply.
III. Bathing.
IV. Mineral springs.
V. Drainage.
VI. Sewerage.
VII. Ventilation.
VIII. Diet.
IX. Famines.
X. Epidemics.
XI. Military and naval hygiene.
XII. Climate.
XIII. Registration.
XIV. Life insurance.
XV. Hospitals.

To look through Dr. Storer's catalogue, which covers upwards of 2466 pieces, classified as above, is to realize the extent to which medals commemorating sanitation have touched well-nigh every aspect of human activity. After Vittorio Pisano of Verona began to make medals in fifteenth-century Italy, a true medal was cast, but in the fourteenth century and later (in the reign of James I in England), jetons were struck off, while tokens, or pseudocoins, issued by private persons without government backing or sanction, began to be issued by English tradesmen in the reign of Elizabeth. The brass-farthings current in England under James I and Charles I were called "Harringtons," because the patent for issuing these tokens was first granted, in 1613, to Lord Harrington. The old chronicler, Spark (1650), describes this transaction as "a thing that brought with it contempt though lawful." In other words, tokens were to real money as securities not issued by government are to government bonds, i.e., the pledge taken to redeem them on demand depended on the good faith of those issuing them, and was a matter of chance. Thus Wotton says, in his Relics of 1672: "I have lost four or five friends and not gotten the value of one Harrington." In Ben Jonson we read[14]: I will not bate a Harrington o' the sum."

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[11] Storer, H. R. *Tr. Rhode Island M. Soc.*, 1889–1891. Providence, 1890–1892, IV, 294–297.

[12] *N. Engl. M. Monthly*, Bridgeport, Conn., 1886–1887, VI, 78; 102.

[13] *Sanitarian*, N. Y., 1887, XVII, 428; XIX, 9; 159; 316: 1888, XX, 158; 337: XXI, 46; 149; 424: 1889, XXII, 134; 235; 328; 521; XXIII, 239; 436: 1890, XXIV, 52; 155; 443; XXV, 49; 137; 234; 333: 1891, XXVII, 48; 142; 244: 1893, XXX, 43; 134; 247: 1894, XXXIII, 50; 124; 226; 352: 1898, XL, 323; 439.

The catalogues made by Neumann, Storer and others show that private tokens have been continually issued for the most variegated commercial purposes, even in the interests of quack medicines, catchpenny inventions and clandestine prostitution. Thus Storer lists tin, lead or brass tokens for Ridge's Food for Infants and Invalids, Burchell's Famous Sugar Plums for Worms, Burchell's Anodyne Necklace for Children Cutting Teeth, Ching's Worm Lozenges, Barrell's Worm Confections, Devin's Vegetable Worm-Pastilles, a Tasmanian token for baby-linen, tokens for contraceptive devices, venereal nostrums, congenitally armless people, specialists in female complaints, abortionists, "lady's private baths," private maternity and foundling hospitals, orphan asylums, *poses plastiques* and houses of prostitution. In these, the tokens were the equivalents of pass-words, countersigns or tickets of admission. Prostitutes and roués also had private personal tokens specifying street addresses.

In the case of obstetrics, there have been medals commemorating not only the pregnancy and safe delivery, but also the fecundity of royal ladies, for instance those struck off to commemorate the pregnancy of Maria Lescinska, queen of Louis xv, in 1742, for her safe delivery of twins in 1727. A German medal, called *Die gute Zucht*, immortalizes a woman with five supernumerary breasts. The number of medals commemorating famous obstetricians and gynecologists is considerable.

The book of Pfeiffer and Ruland called "Pestilentia in nummis" (1882) is really, as its sub-title indicates, "a history of the major epidemics as documented in coins and medals." It begins with an account of the years of bad harvests, scarcity of grain and famine, of drought, inundation, harsh winters and swarming of insects and vermin, which were contributory causes to the spread of such epidemics. In this class of numismatic emblems come first the Annona medals, issued all through the sixteenth and seventeenth centuries to commemorate the measures taken by the different Roman pontiffs to keep down the price of corn and other cereals in the Papal States in time of need. This rigorous control of city commerce by the state, while popular and well-meaning, sometimes defeated its own object by the development of private monopolies and by the eventual exhaustion of the reserve granaries through the swarming of hungry outside people to the cities, to be fed in time of famine. Thus after the bad harvest year of 1764, the population of the city of Naples increased from 350,000 to 500,000, while 600,000 outside people were fed from its granaries. In Rome, in the same year, the Annona went bankrupt and was powerless to stave off the subsequent famine. Following the poor harvest of 1361, Karl iv of Bohemia instituted reserve granaries or "corn magazines," but these devices were not always effectual. In Hesse, the state granaries could only hold out for the year 1771. The next year (1772) was one of famine and high prices. In the same year, Frederick the Great had better luck in Prussia, through the simple fact that his then kingdom was largely made up of farmlands, with a small city population and no proletariate. One consequence of the *trek* of hungry people to the cities was epidemic typhus fever, which, as Pfeiffer and Ruland very rightly maintain, was due to the unsanitary conditions consequent upon overcrowding, or, as we would now say, to spread of pediculosis. Plenty of famines have occurred in European states and in India, without a sign of "famine fever." Among the striking famine-medals catalogued and figured by Pfeiffer and Ruland are the Annona medals of 1505–1508, 1540, 1555, 1560–1575, 1642, 1671–1673, 1690, and 1704–1705; the *Brodmarken* or breadtickets (jetons) of Nuremberg (1528–1540), Delfft (1531, 1559), Leyden (1573), Artois (1587), Breslau (1645–1717), Amsterdam (1662), Munich (1771), and other German cities in the same year; the inundation or "high water" medals of Walcheren (1597), Hamburg (1685, 1717, 1756), Silesia (1736–1741, 1854), Holland (1741, 1775), Nuremberg (1784), Königsberg (1801), and Dresden (1845); the hard times and high prices medals of Flanders (1557–1561), Parma (1591), Rome (1591, 1599), Transylvania (1602), Germany (1694, 1713, 1771–1773, 1817, 1847), Nuremberg (1773), Bohemia (1805), Saxony (1806); the "corn-Jew" medals of 1694–1695 and 1771–1772; the grasshopper swarm medals of Silesia and Thuringia (1693); the Saxon mouse-pest medals of 1772–1773; and as forerunners of evil days of famine and epidemics, the comet medals of 1558, 1618, 1677, 1680, 1686 and 1744, which disappeared after the comet seen by Halley in 1682 made its due reappearance, according to his predictions, in 1758. An almost complete purview of the theories entertained as to the causation of epidemic diseases in these earlier periods is afforded in the above lists of famine medals of the sixteenth, seventeenth and eighteenth centuries. To these may be added the plague medals of the Roman Empire (250–254 A.D.), of Italy and Germany throughout the sixteenth and seventeenth centuries (including the Wittenberg "pest-dollars," the medals of the Thirty Years War), and of such localities as Cracow (1707), Hamburg (1709–1713), Prague (1713), Ratisbon (1714), Vienna and environs (1714), Provence (1720–1722), Ancona (1734), Trieste (1769), Russia and the Danube Country (1770), Belgium (1779), Venice (1793), Moldavia and Wallachia (1842). Here too, we see the course of epidemics of bubonic plague very effectively localized in space and time by means of plague-medals. The same thing is true of the cholera-medals and jetons issued by cities all over the Continent during the invasions of 1831–1832, 1835–1836, 1848–1849, 1854–1855 and 1865–1866. Pfeiffer and Ruland describe only two yellow fever medals, viz., those of Barcelona (1821, 1870); but many commemorating the practice of human inoculation against smallpox and the subsequent introduction of vaccination (Jenner medals). Their catalogue, with its fascinating illustrations, closes with a medal of 1777, commemorating the removal of the intramural cemeteries of Breslau to places outside the city walls for sanitary reasons, at the instance of Frederick the Great, and a number of numismatic memorials of the establishment of foundling asylums at Frankfurt a. M., (*circa* 1700), St. Petersburg (1763) and Moscow (1763, Centenary Jubilee medal, 1863), as documents in the history of infant mortality and infant welfare. Such are a few of the interesting sidelights which may be thrown upon the history of epidemiology by numismatics alone.

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[14] The Devil is an Ass, ii, i, 83.

Coming down to the medical medals of more recent date, those of the modern French plastic artists, and particularly those issued by the Paris Mint (*La Monnaie de Paris*) excel in delicacy of finish and the evanescent, elusive quality of impressionistic work in bronze, silver and gold. Nearly all the greater French physicians and scientific men of recent times, Pasteur and Charcot in particular, have been commemorated by beautiful plaques, plaquettes, medallions and medals, as well as in the round. The older medical medals of the Paris Mint illustrate the following subjects:

Period:	Subject.
Louis XIII:	Val de Grâce.
Louis XIV:	Val de Grâce, Establishment of General Hospital, The Invalides, Illness of the King, Recovery of the King.
Louis XV:	Plague at Marseilles, Prize for Naval Surgeons.
Louis XVI:	Academy and School of Surgery, Foundation of the Beaujon Hospital, Lazaretto at Marseilles.
French Republic (1792–1804):	Lavoisier, Public Hygiene, Abbé de l'Epée.

Period:	Subject.
Napoleon I:	Pius VII visits the Institute of Deaf-Mutes, The Schools of Medicine, Pauper Hospital at Genoa.

The recent medals of the Paris Mint (catalogue of 1925) illustrate the following subjects, executed by the best medallists of France:

Medical History:	Aesculapius, Hippocrates, Vaccination, Archeology (Vernier), Gutenberg (Deschamps), Claude Bernard (Borrel), Paul Bert (Borrel), Pasteur (Prud'homme).
Hygiene and Public Welfare:	Hygieia (Prud'homme), Bathing (Lafleur), Alimentation (Lamourdedieu), Marriage pieces (Baudichon, Pillet, Allouard), Charity (Desvignes), Life-saving (Chaplain, Oudine).
Military Medicine:	Mercury with Caduceus (Merlet), Military Preparedness (Legastelois), Recognition of Hospital Personnel (Baudichon), Aviation (Mlle. Montagny), Red Cross (Allouard), Boy Scouts (Legastelors).
Athletics:	Gymnastics (Borrel), Victory (Carriat), Wrestling (Coudray), Dancing (Coudray), Sports (Coudray), Discobolus (Coudray), Cycling (Vernon), Fencing (Mlle. E. Robert-Merignac, Coudray), Boxing (Méry), Skis and Tobogganing (Coudray), Oarsmen (Baudichon), Football (Coudray), Hippomenes and Atalanta (Foot-racing, Carriat), Swimming (Coudray).
Child-Welfare:	Mother Eve (Vernon), Birth (Mlle. Montagny, Legastelois) Maternity (Legastelois) First Steps (Baudichon) The Nest (Daniel-Dupuy), The Awakening (Lamourdedieu), Hope (Dautel), Silver Wedding (Baudichon), Centenary of School for Blind Children (Vernon).
Industrial (Hygiene):	Labor (Coudray, Legastelois), Industry (Coudray), Protection of Apprentices (Blin), Aerial Navigation (Morton), Automobiling (Morlon, Coudray).

Ethnic types of French peasant women by Mlle. Ernesta Robert-Merignac: Vendéenne, Olannaise, Brétonne, Boulonnaise, Auvergnate, Charentaise, Poitevine, Saintongeaise, Alsacienne (Prud'homme).

As good wine needs no bush, so the medals, medallions, plaques and statuettes of our Philadelphia colleague, Dr. R. Tait McKenzie, need no special encomium here. Canadian-born and house physician to the Governor General of Canada up to 1904, he came to Philadelphia in that year to be director and professor of physical education in the University of Pennsylvania. As part of his duties, he had studied the college athlete in repose and action, as the Greek sculptors envisaged their athletic prizemen, but with all the superadded advantages which anthropometry, the newer physiological anatomy, *Konstitutionslehre* and the science of primitive and sophisticated plastics have given to the artistic anatomist and the sculptor. In the spirit of Luca Paccioli and Albrecht Dürer, he has established his canon of proportions by measurements of hundreds of runners and trackmen, but, in the end, his own intelligence and intuition have spontaneously tended away from the dead anatomy (anthropometry) of the Doryophorus into the *plein air* of the vital or physiological anatomy of Leonardo da Vinci. His work includes statuettes of heroes of the World War, medallions and portrait plaques of Benjamin Franklin, Nathaniel Chapman, Crawford W. Long, Weir Mitchell, Sir William Osler, W. W. Keen, Sir Robert Jones, J. William White and other notables of medicine, masques and pieces in the round illustrating the physiology and psychology of violent physical effort, medals commemorative of intercollegiate and artistic association, and above all, a superb portrait plaque in bronze of the late Dr. Horatio R. Storer, the Nestor and *Altmeister* of medical numismatics in our country.

It will be seen, from this very slight and inadequate sketch, that medical coins, medals, plaques, jetons, touch-pieces and tokens have in them much to allure and to arrest the attention of the young student, as guiding threads into some of the most attractive by-ways of medical history. A very considerable number of interesting medical medals are easily obtainable at small cost, and even a slender outfit of these is a good starting point for future historical studies. What is wanted is a good series of primers, such as the Germans get up with competence, to orient the student in subjects like medical archeology, medical bibliography, medical epigraphy, medical heraldry, medical anthropology and folklore, primitive plastic anatomy or medical numismatics. An excellent model is R. C. Peddie's delightful primer of the "Fifteenth Century Books"[15] which not only takes the student, without effort, into the difficult science of the incunabula, but also affords him a sound bibliographic basis of operations for future studies, if he is so inclined. Today, the nations of Europe are celebrating the memory of their great artists, poets, writers, musicians and men of science on postage stamps, as a device for teaching the people to respect and honor the right sort of men in future. To the unlettered, each new stamp is, as Victor Hugo said of statuary: "a nudge to ignorance." France has already issued a beautiful set of Pasteur stamps. Recently the Faculty of Medicine of Oporto has celebrated its hundredth anniversary on a stamp. Soon there will be a little science of medical and scientific philately. And this is but a dim realization of the noble thought of Herder: *Ueber die Erziehung des Menschengeschlechts.*

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At the meeting of the Section on Medical History of the College of Physicians of Philadelphia at which Lt.-Col. Garrison read the above paper, Dr. R. Tait McKenzie, under the title "The Making of a Medal" described the methods of medal design and reproduction, illustrating his talk with lantern slides of the processes of drilling with the bow drill, as practiced by the Egyptians and Greeks, and the striking of coins by hand and by machine, showing various presses used in striking medals and coins.

He described and illustrated the engraved medal and coin, the medal that is cast direct from the original model, as practiced by the Italian artists of the Renaissance, and the modern process of reduction from a large model to a small medal and the making and hardening of dies. This was done by showing examples of dies, trial proofs and finished copies, for the most part the results of his own work.

After the meeting he described the principal medical medals and plaquettes in the collection of eighty-five, kindly loaned by Dr. Henry Barton Jacobs of Boston, which added greatly to the interest of the evening.

Jeton of Guy Patin

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[15] Lond., 1913.

SAMUEL D. GROSS*

By JOHN H. GIBBON, M.D.

PHILADELPHIA, PENNSYLVANIA

NO adequate picture of the life of Samuel D. Gross could be drawn in the space allowed for this paper. The enumeration of his writings, of his honors, of the positions he held, of the medical, surgical and other scientific societies to which he belonged could be made to consume it all. I propose, therefore, to deal with but a few of the many aspects of his very full and productive life; aspects which I think should prove stimulating to those hoping to enter that profession of which Gross was so outstanding an ornament. To those who would have dates and details of his life I refer to his autobiography, which not only gives an interesting picture of the man, but also of his times and contemporaries.

Gross not only exercised the greatest and best influence on the surgery and the surgeons of his day, but was one of those strong characters whose influence is felt by following generations. I have tried, in studying his writings, to see wherein lay his power. His industry, his honesty and his love of his profession and of his fellowman are the points that stand out in the character of this man, and which made him not only respected by the whole surgical world, but loved by all who came in contact with him.

Let us first consider his contributions to medical literature, for he was a prodigious writer and what he wrote did more than anything else to make American surgery respected abroad.

Ten months after he graduated from the Jefferson College, in 1828, he had translated from the French and German four books: Boyle and Hollard's "General Anatomy," Hildenbrand's "Treatise on the Nature, Cause, and Treatment of Typhus," Hatin's "Manual of Practical Obstetrics" and Tavenier's "Operative Surgery"; for all of which he received the handsome reward of $875.00. This work meant more preparation than one might imagine, for the man who did it had only an academy education, and this itself was not acquired easily, for Pennsylvania Dutch was his native tongue and he had literally to learn English as well as Latin and Greek. German, of course, was easily acquired, but his knowledge of French must have been learned with more difficulty than his Greek. Two and one-half years after graduation he published a monograph on "The Anatomy, Physiology and Diseases of the Bones and Joints" in which he first advised the use of adhesive plaster for making extension. This book had a wide sale but brought him no money. So much for an intimation of his youthful industry.

Gross wished to live and work in Philadelphia, but having promptly taken on the responsibilities of a married man, he found, like others before and since, the road too crowded and too rough. So, two or three years after graduation one finds him acquiring a general practice in his native town of Easton, Pennsylvania, but he took with him his ambition, his love of learning and his determination to attain to something more than a mediocre success. His fondness for anatomy had manifested itself in his student days, when it is said the janitor was obliged to put him out of the dissecting room when the hour for closing arrived. Shortly after he had established himself in Easton he had built a little house in his garden where he could carry on dissections and animal experimentation. The first cadaver he dissected accompanied him in his buggy all the way from Philadelphia, a distance of fifty miles. It was at this time that he conceived the idea of writing an anatomy in which English should replace the Latin terminology, a work which was practically accomplished but never published. It is interesting to note that the great scientist and anatomist,

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* Address made before the Section of Medical History of the College of Physicians of Philadelphia, January 19, 1926.

Joseph Leidy, was the first to publish an anatomy in which English terms replaced the Latin. Here in the little town of Easton, Gross carried on, in spite of a growing practice, real research, especially in regard to the temperature of the venous blood and the elimination of drugs by the kidneys, in which connection he sacrificed many rabbits and many of Easton's "harmless, necessary cats." This interesting work and the acquisition of a respectable clientele, however, did not satisfy this ambitious young man, and in 1833 we find him filling the position of demonstrator of anatomy in the Medical College of Ohio. This was his first teaching position and although he held it but two years, it was evident that he had found his *métier*, for he loved it and his students were most enthusiastic. In 1835 he was made professor of pathology and anatomy in the Medical Department of the Cincinnati College, afterwards the University of Cincinnati, and here he laid the first important stone of the foundation of his future career and reputation. He held this chair for four years and in this time prepared and published his "Elements of Pathological Anatomy," in two volumes of 500 pages each, the first publication of its kind in the English language. This work passed through three editions and attracted attention all over the world. In 1863 in Berlin, Virchow gave Gross a dinner and at its conclusion in proposing a toast, drew forth a copy of this work and announced with what pleasure and instruction he constantly referred to it; high praise from such a source.

In 1840 Gross was made professor of surgery in the University of Louisville and here began his great surgical career and success. Teaching and writing became his chief joys, in spite of the fact that he acquired an enormous surgical practice, his patients coming from all over the Southwest. In Louisville, I would say, Gross passed the happiest sixteen years of his life, notwithstanding the fact that it was in Philadelphia that he enjoyed to the full the fruition and honors of all his labors.

Gross manifested the greatest interest in the history of medicine in the United States and did a great deal to stimulate others to investigation and publication in this field. He wrote a very full "Report on Kentucky Surgery," complete monographs on Ephraim McDowell and Daniel Drake, a long article on "August Gottlieb Richter; his Work and Contemporaries," in which was included an account of Desault, Benjamin Bell and Antonio Scarpa, and "A Sketch of the Life, Character and Services of Ambrose Paré." In 1861 he edited a volume of 800 pages containing the "Lives of Eminent American Physicians and Surgeons of the Nineteenth Century," contributing a number of the biographies himself, including that of John Syng Dorsey, a nephew of Philip Syng Physick. He also wrote memoirs of Jedediah Cobb, Charles Wilkins Short, Valentine Mott, Robley Dunglison and Isaac Hays. Still another historical paper dealt with "John Hunter and His Pupils." In the Centennial year he published a "History of American Medical Literature from 1776 to the Present Time."

Let us return now to Louisville and 1840. One of the pieces of work undertaken in his new environment was an experimental study on wounds of the intestine. He utilized seventy dogs in these experiments, the results of which he finally embodied in a volume of 250 pages. This was one of the first exhaustive pieces of experimental work done in this country and was accomplished not only with the expenditure of a large amount of time and labor but of money, for he had to provide his own dogs and employ a man to look after them. His income during this year was "a little short of two thousand dollars." In his autobiography Gross says: "My dogs were no inconsiderable source of annoyance to several of my colleagues. The rooms in which they were lodged became infested with fleas, which, when the air became heated in autumn by the stoves in the college, skipped about in every direction. My friend, the Professor of Chemistry, was especially molested by them, being obliged to appear before his class with his boots over his trousers, to prevent them from effecting an entrance to his body."

In 1850, owing to some controversy in Louisville regarding the government of the medical school, Gross was induced to accept the chair of surgery in the University of New York, made vacant by the retirement of Valentine Mott. He held this position but one session, when, the difficulties of management in the Louisville school having been straightened out, at the earnest solicitation of his former colleagues, he returned to his old post, his successor, Dr. Eve, gracefully and gladly giving place to him. In this one winter in New York City, being relieved of much of the labor of private practice, Gross devoted his spare time to visiting the surgical clinics in the eastern cities and to the writing of two notable books. The first was entitled "A Practical Treatise on the Diseases, Injuries and Malformations of the Urinary Bladder, the Prostate Gland and the Urethra," published in 1851. No book on this subject in the English language had been published in ten years and only two previously, both inferior to this new publication, which soon took an authoritative place in surgical literature. A second edition came out in 1855, and a third under the editorship of the younger Gross in 1876. The second book, one of the best he ever wrote, was "A Practical Treatise on Foreign Bodies in the Air-Passages." It contains 468 pages and fifty-nine wood engravings and was the first work of its kind published in any language. Sir Morrell Mackenzie, speaking of it thirty years later, said: "It is so complete, that it is doubtful whether it will ever be improved upon"; a reckless prophesy in view of recent developments. What would Gross or Mackenzie say today if they could attend a clinic of Chevalier Jackson in Gross's own old school?

A trying decision was presented to Dr. Gross in 1855 and at this late date I may relate it without being accused of bad taste and particularly in view of the cordial relations existing today between the University of Pennsylvania and the Jefferson College. It is probably best told in the following paragraph from Dr. I. Minis Hay's "Memoir of Samuel D. Gross, M.D.":

> In 1855, Dr. Gross was solicited by Dr. René La Roche, a member of the Board of Trustees of the University of Pennsylvania, to allow his name to be placed before that body as a candidate for the chair of Surgery, vacated by the resignation of Dr. Gibson. He was assured that the entire medical faculty, with one exception, that of Dr. Wood, had pledged themselves to support him, and would use their best endeavours to secure his election. Various reasons, however, induced him to decline, and he wrote, at the request of Dr. D. Hayes Agnew, a warm testimonial in favour of Dr. Henry H. Smith who was elected.

In the following year, 1856, much the same proposition came to Gross, in that it involved the severance of his connection with a school and associates to which and to whom he was devoted, but this time it was a call from his Alma Mater, and he accepted. In coming to Jefferson he succeeded the charming and idolized Mutter, to whose attractions as a man and a teacher Gross had paid high tribute after a visit to his clinic in 1850. In a short time, however, he had become more popular as a teacher than Mutter and commanded the love and respect of his classes to a notable degree.

Gross has been described as a peripatetic professor, but a glance at his career will show that each step was an advancement and was taken in every instance into a broader field. At Jefferson he became a fixture and his name will pass down in history inseparably associated with this college, for whose reputation he did more than any man connected with it, before him or since.

Gross' "System of Surgery" may be considered his magnum opus. The first edition appeared in 1859 and there were six subsequent editions, the last in 1882. This work was known throughout the world. It was the first effort of such magnitude from the pen of an American and was the most complete in the English language. It must be remembered, in order properly to estimate the labor, that this "System," containing 2360 pages, was written by one man, differing in this respect from our later "Systems" of medicine and surgery. The *Dublin Journal of Medical Science* in 1874 devoted fifty pages to a review of this work and concluded as follows:

> His work is cosmopolitan, the surgery of the world being fully represented in it. The work, in fact, is so historically unprejudiced, and so eminently practical, that it is almost a false compliment to say that we believe it to be destined to occupy a foremost place as a work of reference while a system of surgery, like the present system of surgery, is the practice of surgeons.

At the beginning of the Civil War Gross wrote a "Manual of Military Surgery" in nine days and it was published in two weeks from the day of its commencement. This little book was used as a guide by both the Federal and Confederate Army surgeons, having been republished in Richmond, Virginia, soon after its appearance. I have only mentioned so far the books and historical essays written by Gross, but they alone, without mention of scores of his excellent papers contributed to societies and journals, justify the statement already made that he was a prodigious writer. The remarkable characteristics of his productions were the amount of original thinking they displayed and the extraordinary experience of the author, on which they were based and with which they were illustrated.

Another feature of the work of this unusual man deserves mention. He founded three societies, all of which have had a life of continued activity and usefulness: The Pathological Society of Philadelphia, The Academy of Surgery of Philadelphia and The American Surgical Association. These organizations have been models on which similar ones in this and other countries have been founded and will continue throughout the history of medicine in the United States as monuments to the memory of the man who had the wisdom and the ability to start them, and who did so much in their earlier years to keep up the high standards on which they were based. He was made president of each and of many other societies to which he belonged. His interests were not, however, confined to surgery, as is shown by the fact that he was one time president of the Academy of the Natural Sciences and of the American Philosophical Society. Honors were literally heaped upon him. He was given a D.C.L. by Oxford in 1872, an LL.D. by Cambridge in 1880 and by the University of Edinburgh and the University of Pennsylvania in 1884. No American before him and few since have been so honored by their profession both at home and abroad.

In 1897 there was unveiled in the City of Washington on the lawn between the Army Medical Museum and the National Museum a heroic bronze statue of Gross, a tribute to his memory by the American Surgical Association and the alumni of the Jefferson Medical College. Congress, with the approval of the President, appropriated $1500.00 to supply the granite base for the statue. It is, I think, a rather sad commentary on our democratic government, that she does nothing officially to honor the men who have been the greatest benefactors of the race, while public property everywhere bears testimonials in bronze and stone to those conspicuous in war and in politics. No other country so neglects her sons distinguished in the sciences during their lives or after their deaths.

I realize that I have said nothing about the personality of Gross, of his handsome face and commanding figure, of his kindly disposition, of his gentle judgment of his fellowman, of his generous hospitality, of his modesty in spite of his accomplishments and of his love of flowers, of animals and of all Nature; but these alone are worthy of a separate communication. I have tried to deal with those aspects of his life which might stimulate my student reader to emulation.

To those who would like to become surgeons, I would present Samuel D. Gross as an example and call attention particularly to the preparatory work which made possible his later remarkable success, to his early study of anatomy, to his study and teaching of pathology, to his wide knowledge of general medicine and to his industry.

J. M. DaCosta said of Gross: "To assign him his proper position he must be named with the Hyrtls, the Trousseaus and the Pagets."

PIONEER MEDICINE IN WESTERN PENNSYLVANIA

PART I

By THEODORE DILLER, M.D.

PITTSBURGH, PENNSYLVANIA

INTRODUCTION

THE story of medicine west of the Allegheny Mountains begins with the French occupation at the junction of the Allegheny and Monongahela Rivers at Pittsburgh. Contest between the English and French for supremacy of the Mississippi Valley was inevitable. Contrecoeur brought a party of Canadians and Indians to the mouth of the Allegheny on April 27, 1754, driving out Ensign Ward, who under English direction was attempting to build a fort there. Contrecoeur erected a fort which he called Duquesne after the governor-general of Canada. The next year the English General Braddock, with a large force, which included Washington and Dr. James Craik, marched against Fort Duquesne. He crossed the Monongahela river at what is now Kennywood Park, near Pittsburgh, and entered what seemed a quiet forest but which was alive with French and Indians. Here Braddock suffered a disastrous defeat and was himself wounded and carried to the rear amid the rattle of musketry and the death yell of the savages. The services of Dr. James Craik, the eminent surgeon-in-chief of the English expedition, and his assistants were in immediate requisition.

Braddock's defeat left the whole western country exposed to the ravages of the Indians; the French forces were supreme in their command of the headwaters of the Ohio river at Fort Duquesne. Three years later, 1758, General John Forbes attempted to do what Braddock had failed to do, viz., take Fort Duquesne and drive the French out of the country, and guard the white inhabitants against the depredations of the Indians. It will thus be seen that upon the successful outcome of the Forbes expedition high hopes were placed. Forbes himself was a sick man and was carried most of the way on a litter. In anticipation, it may be said now that soon after his return to Philadelphia he died; his body is now buried with suitable inscription in old Christ Church.

The French, when Forbes had reached within a few miles of them, burned and abandoned Fort Duquesne and floated on their batteaux down the river, deeming their force inadequate to resist him successfully. When Forbes marched into the ruins of the burned and blown up fort, November 25, 1758, he was accompanied by his military surgeons as well as by several other medical men numbered among his officers of regiments, battalions and provincial troops.

The forces raised in Pennsylvania for the Forbes expedition against Fort Duquesne in 1758, called a regiment, were in three battalions, the general officers being Brevet Lieutenant Colonel John Shippen (son of Edward Shippen of Lancaster); commissary of the musters and paymaster, James Young; surgeon, Dr. Bond; chaplain, Rev. Thomas Barton, Church of England minister at Lancaster, rector of St. James Church; wagon master, Robert Irwin, and deputy wagon master, Mordecai Thompson of Chester County.

The First Battalion was commanded by Col. John Armstrong, leader of the Kittanining Expedition; Lieutenant-Colonel Hance Hamilton of York; Major Jacob Orndt; Surgeon Blain; chaplain, Rev. Charles Beatty (a Presbyterian); adjutant, John Phillip de Haas, and quartermaster, Thomas Sullivan.

The Second Battalion was commanded by Colonel James Burd, a Scotchman by birth, who had married into the Shippen family and lived not far from Harris' Ferry, the present Harrisburg. His lieutenant-colonel was Thomas Lloyd, apparently the physician of that name, great grandson of the former lieutenant-governor; the major was David Jamison; other officers were: surgeon, John Morgan; chaplain, Rev. John Steel (Presbyterian); adjutant, Jacob Kern; quartermaster, Asher Clayton and commissary, Peter Bard; James Hayes took Colonel Burd's company and was wounded at Grant's defeat, Grant's Hill; Samuel Miles of Philadelphia county as lieutenant took Colonel Lloyd's company and was wounded in an attack on French and Indians at Ligonier.

The other companies, apparently, were led by Christian Busse, Joseph Scott, Samuel Weiser, Alexander McKee, John Byers, John Haslett, John Singleton and Robert Eastburn. The Third Battalion was commanded by Colonel (Dr.) Hugh Mercer, whose lieutenant-colonel was Patrick Work, the other officers being: Major George Armstrong; surgeon, Robert Bines, chaplain, Rev. Andrew Bay; adjutant, James Ewing; quartermaster, Thomas Hutchins, and sergeant-major, Samuel Culbertson.

Colonel Hugh Mercer was left in charge of Fort Pitt upon Forbes' departure for the east. Mercer was an army colonel, but before that a doctor of medicine. Mercer, the first man in authority at Fort Pitt, a military man and physician, was followed by several others who were also military men and physicians. Indeed it was surprising to the author to learn the large number of men of this sort that he discovered. The first physicians in Pittsburgh were all military men. Dr. Arthur St. Clair, who represented Washington on the western frontier, was a physician; so was Dr. John Connolly, who represented Governor Dunmore. Drs. Edward Hand and William Irvine, two of the commandants at the Fort following Dr. Hugh Mercer, were also military men. Dr. John Knight, whose heroic adventures with Crawford will ever be remembered, was a miliary man. Dr. George Stevenson, Dr. Nathaniel Bedford, Dr. Andrew Richardson are names of prominent physicians of Pittsburgh who were military men. Other notable physicians who were possessors of military titles were the following: Drs. David Marchand, Samuel Marchand, Frederick Marchand, Felix Brunot, Frank LeMoyne, John Wishart, Joel Lewis, James King, Cyrus B. King, Silas N. Benham, James McCann, James Bissett Murdoch.

It is very interesting to note that there are several families in which there are physicians in three or more generations and among these may be mentioned the names of Wishart, LeMoyne, Marchand, Mowry, Shaw, Mabon, and Gallagher.

Considering the national groups, we find that the early physicians of Pittsburgh and the Pittsburgh district came from England, Ireland, Scotland, France, Germany and Switzerland, and that in the early days a great many of them came from Carlisle, more than from any other part of this country.

There are at least three notable physicians who performed the dual function of minister of religion and practitioner of medicine: Doddridge, Dodd and Jennings. All three appear to have done this well, all three were noble, high-minded men who labored most earnestly for both the souls and bodies of their fellowmen.

One physician, Addison, was the son of Judge Addison; Dr. Agnew was the father of Chief-Justice Agnew; Dr. Edward Gazzam, brother of Dr. J. P. Gazzam, left medicine to study law. Thus it will be seen there was some connection between medicine and law. There have been occasionally from time to time physicians who go into business, and some of them return to medicine. There is a saying: "Once a priest, always a priest." This may be paraphrased: Once a physician, always a physician.

Where there are medical men, there are sure to be medical organizations. The first medical organization the author can find is the Western Medical Society, which was organized in 1814. This was followed by the Allegheny Medical Society in 1838, the Nathaniel Bedford Club in 1864, the Allegheny County Medical Society in 1865, the

Academy of Medicine in 1888 and the College of Physicians in 1906. A number of smaller medical clubs were also organized, among them the Fortnightly Club, the Austin Flint Club and others.

THE EARLIEST MEDICAL MEN OF PITTSBURGH

JAMES CRAIK

Dr. James Craik was born in Scotland, and came to this country with Braddock on his expedition. He was with Washington at the battle of Great Meadows. Braddock himself was wounded in his disastrous engagement against Fort Pitt and carried to the rear, and died July 9, 1735. His wounds were dressed by Dr. Craik, assisted by Drs. Anderson and Colhoun. Washington himself read the burial service from the Book of Common Prayer assisted by Dr. Craik. Later Dr. Craik was appointed to the medical department of the army by General Washington and raised to the position of physician-in-chief. For many years he was Washington's private physician and enjoyed his friendship. He accompanied Washington on his visit to Fort Pitt in 1770 and here he met Dr. John Connolly at Semple's Tavern. He died in Fairfax County Virginia, in 1814. Washington in his will wrote of Dr. Craik these tender words: "My compatriot in arms, my old familiar friend."

DR. JAMES CRAIK, WASHINGTON'S PRIVATE PHYSICIAN, WHO ACCOMPANIED THE BRADDOCK EXPEDITION AND ADMINISTERED TO BRADDOCK AFTER HE WAS WOUNDED, AND ATTENDED WASHINGTON IN HIS LAST SICKNESS.

HUGH MERCER

Dr. Hugh Mercer was the son of a minister of the Church of Scotland and was born at Aberdeen. He studied at the University in his native town. In 1740 he entered the medical school of Marischal College from which he was graduated in 1744. One year after graduation he became attached to the army of Prince Charles, the Pretender, affectionately called by the Scotch "Bonnie Prince Charlie." He took part in the battle of Culloden in 1745 when the Scotch were disastrously defeated. The next year he took passage for America; and after a short stay in Philadelphia moved westward and settled in a place called Greencastle, which later was called Mercersburg. Here, as a pioneer doctor in the wilderness, he practiced medicine, in this sparsely settled country. It may well be imagined he encountered many adventures and that he was called upon in every possible way, mental and physical, to assist the people among whom he had settled.

The spirit of the soldier in this pioneer doctor asserted itself at the outbreak of the French and Indian war. He entered General Braddock's army as Captain and was present at his defeat in his attempt to take Fort Duquesne. In this engagement Mercer was wounded and left behind. Later, after many hardships, he succeeded in rejoining the army.

The next year he joined the force of Armstrong, who marched against the Indians and their French allies at Kittaning. This expedition did much to save the inhabitants from the depredations of the Indians, to which they were sadly exposed after Braddock's defeat. On this expedition he was stationed at Bridgeport as assistant surgeon to the garrison and practiced among the people. In an engagement against the Indians he was again wounded and again forced to make his way through hundreds of miles of forest alone. On this weary tramp he was forced to live on herbs and roots and for a time maintained himself by devouring the carcass of a rattlesnake. On one occasion he took refuge in a hollow tree while the Indians were nearby. Finally, after many perils, he reached Will's Creek, since called Fort Cumberland.

For his services under Braddock and Armstrong Mercer received in 1756 from the corporation of Philadelphia a note of thanks and a memorial medal. The next year, 1757, Mercer was in command of the garrison at Shippensburg; December of this year he was promoted to the rank of major-general and placed in command of all the forces in the province of Pennsylvania west of the Susquehanna.

Hugh Mercer as a Country Doctor in Pennsylvania, the First Physician to Practice Medicine in Pittsburgh.

In 1758 Mercer joined the forces of Gen. John Forbes in the expedition against Fort Duquesne, this being his third military excursion to Western Pennsylvania. As is known to all students of history, with the approach of General Forbes' army within a few miles of the Fort, the French set fire to the Fort, abandoned it and floated on batteaux down the river. The victorious troops under Forbes took possession. The British flag was at once raised and the place, in honor of the great premier of England, called Fort Pitt and later Pittsburgh.

Leaving Mercer in charge of the fort with two hundred men, Forbes marched eastward and a few weeks after arriving in Philadelphia, died. So it is seen that the first man in official authority at the very beginning of the town of Pittsburgh was a doctor, Hugh Mercer, a man of the highest character who was an ornament to two professions, that of arms and that of medicine.

Left in the smoldering remains of the French fort with two hundred men, subject to attack by the Indians and by the returning French, the hero of Culloden, of Braddock's Field and Armstrong's expedition, and the pioneer physician of Franklin County was undaunted; he carried on his task until the temporary fort was completed, January, 1759, which sufficed for the purpose of his small force until he was relieved the next year by General Stanwix. The latter demolished this temporary fort and built in its place a very substantial and costly one which endured until 1791.

Soon after the termination of the French and Indian war, Mercer moved to Fredericksburg, Virginia, and resumed the practice of medicine. His residence for a number of years was a two-story frame house on the corner of Princess Ann and Amelia Streets. To visiting automobilists this house is still pointed out. Soon after he settled in Fredericksburg he married Isabella Gordon of that town by whom he had one daughter and four sons. Here he became the friend and companion of John Paul Jones, who also was living in this quiet Virginia town, a lieutenant in the Continental Navy. Doubtless these two illustrious heroes talked over matters of the old home land, exchanging many a tale of adventure.

In 1784 an English traveller published an account of a visit he had made to Fredericksburg during the Revolutionary War. He says: "I arrived in Fredericksburg and put up at an inn kept by one Weedon, who is now a general officer in the American army and who was then very active and zealous in blowing the flames of sedition. In Fredericksburg, I called upon a worthy and intimate friend, Dr. Hugh Mercer, a physician of great eminence and merit, and as a man, possessed of almost every virtue and accomplishment. Dr. Mercer was afterwards a Brigadier-General of the American army and to accept which appointment, I have reason to believe, he was greatly influenced by General Washington, with whom he had long been in intimacy and bonds of friendship. For Dr. Mercer was generally of a just and moderate way of thinking and possessed of liberal sentiments and a generosity of principle very uncommon among those with whom he embarked."

The inn to which he referred is the Rising Sun Tavern which stands on upper Main Street. Weedon, who was said to have been actively engaged in blowing the flames of sedition, was a brother-in-law of Mercer. This loyal son of Britain and admirer of Hugh Mercer was severe on anything that appeared to him to be disloyalty.

Living in the quiet town of Fredericksburg, Mercer pursued his duties of country doctor. He was welcomed at hospitable homes and often found time for social diversions. He was a member of Lodge 4, A.F. A.M., of which Washington was also a member, and he occasionally made visits to the home of Washington at Mt. Vernon.

With the beginning of the Revolutionary War, the military man in Mercer once more submerged the medical man, and he actively engaged himself in drilling troops; he became a colonel of the 3rd Virginia Continentals, and June 8, 1776, he was promoted to be brigadier-general in recognition of distinguished services. He was with Washington at the battle of Princeton. Here he received seven bayonet wounds and was struck in the head with the butt of a musket. He was removed to a nearby farmhouse where he was tenderly cared for by the wife and daughter of the owner of the farm and by Major Lewis, who had been sent to his aid by General Washington. Dr. Benjamin Rush of Philadelphia and Dr. Archibald Alexander of Virginia rendered the wounded man all possible medical and surgical assistance but he succumbed to his wounds, January 12, 1777. He was buried in Christ Churchyard, Philadelphia, and many years later his body was removed to Laurel Hill Cemetery where a monument was erected to his memory by the St. Andrew's Society, of which he had been a member since 1757. This monument was dedicated in 1840: and upon it are engraved these words: "General Mercer, Physician, Fredericksburg, Va. Distinguished for his skill and learning, his gentleness and decision, his refinement and humanity."

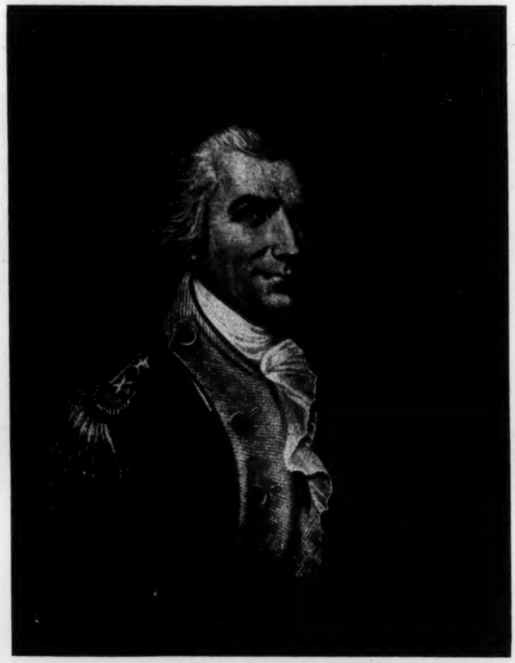
Soon after his death a monument to his memory was recommended to be erected at Fredericksburg, Virginia, and June 28, 1902, an act was passed by Congress that this resolution of Congress of 1777 be carried into effect. A splendid monument has in recent years been erected at Princeton to the memory of Mercer and is an inspiration to many hundreds of students in this great college of learning. Besides these monuments, our hero's name is perpetuated in Mercersburg, Pennsylvania, now the seat of learning of a great boys' school, the town and county of Mercer, Pennsylvania, and Mercer County, New Jersey, in which Princeton is located.

There is a fine portrait of Mercer in the possession of the Mercersburg Academy and a fine historical painting of the battle of Princeton by Peale is to be seen at Princeton, painted by Trumbull of New York.

Such is the picture of the first man in command of Pittsburgh, the first physician to practice medicine in this place. While it is true that Mercer's official position was that of a military character, yet we must suppose, indeed we know with reasonable certainty, that he practiced medicine while in command at Fort Pitt, for we have no account of any other doctor in the fort and we do know from the records there were several deaths and a number of cases of illness there during the time Mercer was in charge. No other theory is plausible than that Mercer, during the time he was in charge of Fort Pitt, exercised his office of physician.

ARTHUR ST. CLAIR

Arthur St. Clair is another example of a man with the education of a physician who laid aside the work of a doctor to take up that of arms. St. Clair was born in Scotland but came to this country as quite a young man. He made a speech at the opening of the courthouse at Hannistown, capital of Westmoreland County. He contended against John Connolly in 1773, causing his arrest, and later he suffered a disastrous defeat by the Indians. By Washington he was made governor of Ohio. In his old age he returned to live near his old home in Ligonier. He died a very old man in great poverty.



GENERAL ARTHUR ST. CLAIR.
DR. ST. CLAIR OPPOSED DR. JOHN CONNOLLY IN HIS ATTEMPT TO MAKE WESTERN PENNSYLVANIA PART OF VIRGINIA.

JOHN CONNOLLY

We must now introduce a physician who by many is considered a bad character, a conclusion which might be questioned. But certainly his career was most picturesque and interesting; he cut an important figure in Pittsburgh in the early days, and although he figures as a political character rather than a physician, it seems proper that a brief reference to his career should be recorded in this history. Dr. Connolly wrote quite an extended biography of himself.

In this biography he states: "I was born in America of respectable parents and received as perfect an education as the country could afford. In the early part of my life I was bred to physic, the practice of which it was intended I should pursue; my natural bent of mind, however, determined otherwise. It was my ambition to be a soldier." Dr. Connolly is said to have studied medicine with Dr. Cadwalader Evans of Philadelphia, and whether or not he was entitled to a medical degree, it appears he was commonly called Dr. Connolly.

It will be recalled that Dr. John Connolly is mentioned as stopping at Semple's Inn with Washington in 1770 on his visit to the Fort. He married the landlord's daughter. Whether he made love to her on this occasion is not known. One account states that he was at this time the husband of Semple's daughter. He had explored extensively along the Cumberland River and delighted Washington with the glowing accounts which he gave of that locality. He also interested Lord Dunmore, governor of Virginia, in this country. Dunmore was loyal to the British crown all through his career and was desirous of claiming for Virginia all the land that he possibly could.

The boundary dispute was an old one, dating back to 1752. It now became acute. Directed by his master, Lord Dunmore, Connolly appeared at the county seat, Hannistown (two or three miles from Greensburg), and in high-handed manner declared the country part of Virginia. Oddly enough, Dr. Connolly was by order of another doctor of medicine, namely, General Arthur St. Clair, arrested. But he was soon released on bail, and hurrying to Stanton, Virginia, he was sworn in as justice of the peace. Armed with this authority, he returned to Hannistown, threw a cordon of soldiers about the courthouse and forbade the magistrates to sit and hold court.

Connolly tyrannized and abused the inhabitants in outrageous fashion. He renamed Fort Pitt (which in 1772 had fallen into sad decay under General Gage) Fort Dunmore. A number of manifestos and letters were dated Fort Dunmore. In 1774 Lord Dunmore himself passed through Fort Pitt on his way down the Ohio to cooperate with General Lewis against the Indians, who at that time were very troublesome.

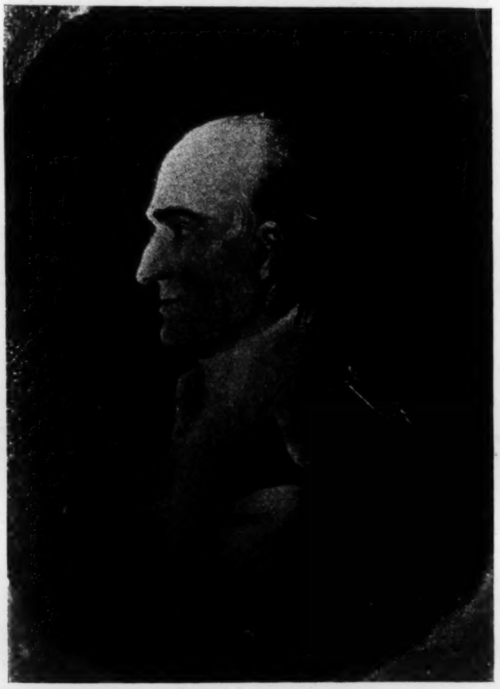
But the events of the Revolutionary War were marching rapidly on and by 1775 Dr. Connolly was forced to leave. Soon after, with his royal master, Lord Dunmore, he boarded a British ship and sailed from these shores for England.

After the departure of Dr. Connolly, Captain John Neville, who was destined in 1794 to cut a conspicuous figure during the Whiskey Insurrection (being at that time excise officer under Washington) was ordered from Virginia to Fort Pitt, where he took possession with one hundred men. He remained on the ground until 1777 when he was relieved by General Edward Hand, who was also a physician.

Edward Hand

Edward Hand came to this country in 1774 with the 18th Royal Irish regiment. But soon after his arrival in America he espoused the cause of the Colonists and the next year received a commission in the Continental Army.

Dr. Hand started the practice of medicine in Lancaster in 1775. He knew and met Washington many times. Soon he gave up the practice of medicine to take up the profession of arms. In 1776 he was ordered to proceed to Pittsburgh from Bedford, with fifty men and stores for the relief of Fort Pitt. He arrived there and took command in January, 1777. At this time he held the rank of adjutant-general. General Hand remained here until May 26, 1778, when he was succeeded by General MacIntosh. He made a number of reports and wrote a number of letters while here in Pittsburgh as a military man. Yet we have evidence that he practiced medicine also, for two missionaries, passing through Pittsburgh, recorded in the diary of one of them: "Mr. Frisbee, unwell, Dr. Hand, a surgeon of the British Army, very attentively and gratuitously attended him during his sickness." In 1778, Hand commanded troops at Albany and the next year joined Sullivan's expedition which marched against the Indians in the Wyoming Valley. Here he suffered hardship and danger and rendered great service to the country. Congress, with Washington, agreed it was the most brilliant event of the year. In 1782 Hand was made major-general.



Brigadier General Edward Hand, M.D.

After the war, Hand returned to Lancaster, Pennsylvania, where he resided until his death in 1802. Here he not only practiced medicine but took an active part in the affairs of the town and in 1784–1785 he represented the district in Congress. He married and became the father of several children born in Lancaster, some before and some after the Revolutionary War. He became a member of the vestry of old St. James Church. The minutes of the church show that he was regular in his attendance of the meetings of this body. General Hand's body lies in the quaint old churchyard of St. James, marked by a simple, dignified monument which may be readily seen from the street by passers-by.

Hand Street, Pittsburgh, now Ninth Street, recalls to mind our hero.

Brigadier General William Irvine, Commandant at Fort Pitt from 1781 to 1783.

William Irvine[1]

In 1781, General Brodhead was succeeded by General William Irvine as commandant at the Fort, where he remained two years, during which time he much improved and strengthened it. In Irvine we have once more the combination of the military and the medical man. Irvine studied medicine in the famous college of Dublin under the celebrated Dr. Cleghorn and for a period of seven years acted as surgeon on a British man-of-war. Soon after the conclusion of peace, he practiced medicine in Carlisle, Pennsylvania. Here, despite manners habitually reserved and austere, by his diligence and skill he won for himself the general confidence of the public and built up a fine practice. His brother, Matthew, was a surgeon with Lee's Legions. At the time he took command of Fort Pitt he was forty years of age. He was now a seasoned warrior for he had been through the Revolutionary War. He was at the head of the troops of Pennsylvania in the Whiskey Insurrection. After serving in Pittsburgh he removed to Philadelphia and here he was made president of the Society of Cincinnati.

During Irvine's command of Fort Pitt, the last battle of the Revolutionary War in this section was fought, July 13, 1782. Colonel Crawford, who had been routed by the British and Indians at Sandusky, in June encountered a force of Indians under Guyasuta, the well-known chief, and in this campaign Hannistown, still the county seat, was burned—all but two homes. Two Indians were killed and the inhabitants lost one girl. Hannistown was never rebuilt; and after a year the courts were removed to Greensburg, which continued as the Westmoreland County Seat until 1788, when Allegheny County was created of which Pittsburgh was made the County Seat.

General Irvine was twice a member of Congress. He died in 1804 at the age of sixty-four. A grandson, W. W. Irvine, practiced in Warren County and a street in Pittsburgh bears his name.

John Knight

Dr. John Knight settled in Fayette County at a very early date. In 1776 he enlisted from West Augusta (then part of Virginia by force of Connolly) as a private soldier. Afterwards he was appointed surgeon's mate in the 9th Virginia Regiment. On August 9, 1778, he was appointed surgeon of the 7th Pennsylvania Regiment and stationed at Fort Pitt on the recommendation of General Irvine. In 1782 Colonel W. Crawford, an old friend and boyhood companion of Washington, organized an expedition against the Indians in the northern part of the state. At this time, Knight accepted Crawford's invitation to accompany him as surgeon of the expedition. This expedition resulted very disastrously, Crawford was taken by the Indians and burned at the stake, Dr. Knight being compelled to witness it. After the burning, Dr. Knight, whose face had been blackened, was sent ahead with one powerful Indian. The mosquitoes were bad and to escape the pests, the Indian released Knight and ordered him to brush away the pests while he prepared supper. This was Knight's chance; and seizing a heavy club he struck the Indian a blow on the head and escaped. He reached Fort Pitt only after many days of incredible suffering. Dr. Knight died at Shelbyville, Kentucky, in 1838.

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[1] Sometimes spelled Irwine.

JOHN ROSE

Another physician who accompanied the Crawford expedition was Dr. John Rose, as he was known in this country, but whose true name was Henri-Gustave Rosenthall. Having fought a duel, he fled from his native country, changed his name and rose to distinction by his bravery and talent. Receiving immunity from his sovereign, he returned to Europe in 1784.

SOME OF THE EARLY PHYSICIANS AT FORT PITT

As has been pointed out before, General Stanwix relieved Colonel Hugh Mercer at Fort Pitt in 1759 and destroyed the temporary structure Mercer had erected. Following Stanwix there were a number of commanders in charge of Fort Pitt, several of whom we shall consider.

Ecuyar, who was in charge of the Fort in 1763, the year of the Pontiac conspiracy and of the Rushy Run battle, mentions that Dr. Boyd was in the Fort October 17, 1765, and "that he built a hospital under the draw bridge." Why was the hospital built in this position? Was it because of the protection the bridge afforded or that the water offered convenient opportunity for cleanliness?

Dr. McKenzie was the principal surgeon at Fort Pitt in 1788. Dr. Adams was there from 1794 to 1797 and Dr. Wilkins from 1795 to 1796.

JOHN DAVID SCHOEFF

Dr. John David Schoeff visited Pittsburgh one year after the burning of Hannistown, and just about the time Dr. Irvine was retired from Fort Pitt, in the summer of 1787. He was the first person to cross the Allegheny Mountains in a carriage. Dr. Schoeff was attached to the German troops employed by the British in the capacity of surgeon. After the war he spent two years in travelling.

In 1784, Arthur Lee, commissioner to treat with the Indians, passing through Pittsburgh, writes: "There are four attorneys, two doctors, and no priest of any persuasion, neither church nor chapel, so that they are likely to be damned without the benefit of the clergy." He adds: "The place, I believe, will never be very considerable."

ARTHUR LEE.
IN 1784 ARTHUR LEE EXPRESSED THE BELIEF THAT PITTSBURGH WOULD "NEVER BE VERY CONSIDERABLE."

The two physicians referred to are Dr. Nathaniel Bedford, and probably Dr. Thomas Parker, as his name appears with Dr. Bedford's in the first list of Trustees of the Pittsburgh Academy, published in the *Pittsburgh Gazette*, March 24, 1787. From his being elected to such an honorable position, we would infer that he had been there for some time and was a man of education. He was secretary of the Board in 1791.

NATHANIEL BEDFORD

Dr. Nathaniel Bedford was the first physician to settle permanently in Pittsburgh for the chief and only purpose of practicing medicine as a profession. He was attached to one of the English regiments at the garrison at Fort Pitt sometime prior to 1770 (the *Gazette* of August 26, 1786, states Bedford was here in 1765) for his resignation was announced in that year. Bedford lived for years in a beautiful house on Seventh and Liberty Streets, extending back to Penn Avenue. He affected the style of an English gentleman, had servants, hunting dogs and lived in great luxury for those days. He appears to have been well educated and composed in Latin. Bedford married Jane Ormsby, daughter of John Ormsby, a leading merchant. At her death he inherited a large tract of land from her father. The *Gazette* of 1811 advertised lots for sale by him in Birmingham. It appears he withdrew from practice after his wife's death and married her lady's maid, living across the river on the Southside.

Christmas day, 1779, Red Pole and Blue Jacket, two Indian chiefs, were detained in Pittsburgh. The former, taken sick, was attended by Dr. Bedford, assisted by Dr. John Carmichaels of New Jersey (in the army 1789, resigned 1804). Red Pole died three weeks later and his body was buried in Trinity Churchyard where his grave is marked by a bronze tablet. A few feet from this grave is that of Dr. Nathaniel Bedford; so oddly enough the physician and his red-skinned patient lie side by side in the shadow of the church of which Bedford was a vestryman. Bedford was one of the incorporators of the Pittsburgh Academy, now the University of Pittsburgh, in 1806.

Bedford laid out Birmingham and named Carson Street, after an old friend, a seaman, who was probably a brother of Mrs. James O'Hara. Dr. Bedford died childless in 1818 at the age of sixty-four. His grave was in the front yard of John Nusser at the head of 12th Street, from whence it was removed to the Trinity Churchyard a few years ago.

PETER MOWRY

Dr. Peter Mowry was born in Pittsburgh, September 14, 1770. At the age of fourteen he was apprenticed to Dr. Nathaniel Bedford "to be taught the Science and Art of Medicine and Surgery." Evidently he was well taught for he was a successful practitioner and rose to distinction and eminence. He upheld the dignity of his profession and impressed upon his students the great responsibility of their calling. He advised hospital experience as the best way of becoming a skilled physician. On one occasion he said. "God help the quack, who with little knowledge and much impudence rushes in where conscientious men fear to enter." Dr. Mowry passed all his professional life in Pittsburgh and died at the age of sixty-three. Like his preceptor, Dr. Bedford, he was a vestryman of Trinity Church. He left two sons, William and Bedford, who were physicians, but both of whom died in early manhood. So Dr. Mowry's mantle fell upon his nephew, Robert Mowry, who was born in Pittsburgh, December 23, 1813, and read medicine with his uncle. He was graduated from Jefferson College in 1836. In 1876 he was elected president of the State Medical Society. Among his visible monuments is the Allegheny General Hospital, with the foundation of which he was materially concerned. He died March 14, 1895.

GEORGE STEVENSON

Dr. George Stevenson was born in New York in 1759. At the outbreak of the Revolutionary War he was a student in Carlisle. Here with teachers and students he joined the army, saw action at the battle of Brandywine and spent the winter at Valley Forge. During the war he completed his medical education and re-enlisted in the army as surgeon. Later he returned to his home town, Carlisle, and practiced his profession there until 1794. In this year he joined the troops which Washington was sending to Pittsburgh to put down the Whiskey Insurrection. Arriving in this town with the troops, Stevenson was so attracted by the country and the prospects that he resigned from the army and set up an office in Pittsburgh for the practice of medicine, his colleagues being at that time Bedford and Mowry. For many years he was a leading figure in the local affairs of this town, not only as a medical man but also as a conspicuously public spirited and patriotic citizen. He took an active part in the educational and social life of the city.

Dr. Stevenson was elected chief burgess, May 23, 1801. He was one of the original directors of the Western University of Pennsylvania in 1819. In 1825 he returned east and died in Wilmington, Delaware. Dr. Stevenson left two sons, Henry A. of the United States Army and Dr. P. C. Stevenson of Carlisle. In the directory Dr. Stevenson's residence is given as on Penn Avenue, between Hays and Pitt Streets.

ANDREW RICHARDSON

Dr. Andrew Richardson began the practice of medicine in Pittsburgh in 1798; so he was a colleague of Bedford, Mowry, Brunot and Stevenson, and among the late eighteenth century physicians of the town. In common with other physicians of his day, Richardson, besides pursuing his profession, engaged in many other activities. At the Fourth of July celebration in 1801 he delivered an animated oration which brought forth great applause. Richardson collected an unusually good medical library for his day, including several works in Latin. Like Bedford he conducted himself in a dignified manner, wore a high collar and stock, and carried a gold-headed cane. He was a member of the Trinity Church and like Bedford and Mowry was made vestryman in 1805. He died in 1809, leaving a widow but no children.

MEDICAL PRACTICE IN PITTSBURGH IN THE DAYS OF BEDFORD AND MOWRY

Following the custom prevailing in England, young men aspiring to a medical career became apprenticed to a surgeon or physician, just as other young men who aspired to master the various trades. The accounts which have come to us lead us to believe that this apprenticeship was rather a rough and strenuous career; still it made for versatility and resourcefulness. The pioneer physician welcomed a student in his office, for this meant a very substantial help for him. The student's duties were to clean the office, brush the boots and clothing of the doctor and take care of the horse and stable, and he was expected to study the books offered by his preceptor and to assist in operations. He was expected to pull teeth, to bleed and be a sort of junior physician and general handy man. All this before he took a course of lectures in the east. All medicines were obtained in the crude form and the apprentice ground them in a mortar —no small job. Oftentimes he was subjected to strong odors and fumes which irritated the eyes and nose. He was early taught to cup, bleed and apply leeches which he himself had procured from the neighboring stream. He performed much menial labor, chopping wood, running errands and it is even said "in Philadelphia helped the doctor's good wife with the family washing." As he progressed the apprentice helped his master in surgery, which was often a difficult task in the days before anesthetics. He accompanied the doctor, carrying the lantern by night and the saddle bags by day. After this rather long course of preliminary training at home he crossed the mountains and attained a course of lectures in some medical school. When he returned he was commonly called "Doc" and aspiring mothers regarded him as a desirable catch for their daughters. Then the young doctor opened a "shop" and put out his sign. Very likely he inserted cards in the local newspapers. There are a number of examples of such cards published in the *Pittsburgh Gazette* in the early days.

The careers of the first physicians of Pittsburgh were identical with that of its poorest pioneer. The streets of Pittsburgh were few, crooked and unpaved; there was no sewage; country roads were mere cow paths, often irregular and misleading. The Indians dogged his footsteps and he was in constant danger of their depredations, to whom it made no difference whether the scalp at their sides was that of a priest, a physician or a trader. As streets were unlighted and the physician might be summoned to the home of one of the prominent citizens or to the hut of a squatter, or to attend an Indian; he must find his way about as best he could. Bedford, Mowry, Stevenson, Brunot and Richardson first made their way about on foot or horseback. Later two-wheeled gigs were introduced which made travelling more tolerable if not exactly comfortable. These pioneers travelled with their saddlebags. Their work was arduous and they travelled far and near; their fees were small, often a mere "thank you" sufficed. But their services were acceptable and the importance of these pioneer physicians was recognized. Their devotion to duty was high. A barbarous custom, which it appears was rigidly followed, was to give the place of honor to physicians at funerals. So as the procession began its march to the grave, it was headed by the attending physician; and we can only imagine what his emotions were while leading such a procession over rough, muddy roads to the cemetery or graveyard where religious services, not brief in duration, were held.

In the days of Bedford, Mowry, Stevenson, Brunot and Richardson, physicians compounded their own prescriptions, a task which was time-consuming and exacting. The surgeon of today can best appreciate what must have been the handicap of these early physicians in attempting to perform operations when he considers that their instruments were the crudest and simplest and that they were entirely without antiseptics or anesthetics.

FRENCH PHYSICIANS

The names of Marchand, LeMoyne and Brunot stand out most conspicuously in the history of medicine in Western Pennsylvania. It may be doubted whether in the whole annals of American medicine the record of the Marchand family can be equalled or excelled, for its pioneer character, the large number and the sterling worth of the men it contributed to the medical profession. And doubtless even this amazing number of physicians in one family is incomplete, long as it is.

Three generations of LeMoynes made a profound impression upon the history of medicine in Western Pennsylvania.

Dr. Felix Brunot left behind him a distinguished name and his talented and highly honored son, Felix Brunot, found an outlet for his sympathies and talent in directions other than medicine. But may we not infer from the fact that he was widely known as a philanthropist that he inherited some of his father's instincts?

Thus the names of Marchand, LeMoyne and Brunot are an honor alike to France, America and the medical profession.

THE MARCHAND FAMILY[2]

The earliest known ancestor of this family is Jean Marchand, of Sonvillier canton of Berne, Switzerland. The records of that place show the name to be the most common and one of the most ancient there. There is every reason to believe tradition that the original Marchands, of Sonvilliers, were Huguenots and were driven from France at or prior to the Revocation of the Edict of Nantes by Louis XIV, October 18, 1685.

David Marchand, son of Dr. David and Judith Marie Marchand, was born in Sonvilliers, May 4, 1746. He married Elizabeth, daughter of Ludwick Kemerer (sometimes called Cameron) and in August, 1770, came to Sewickley Settlement and took up a claim on the little Sewickley Creek, about two miles south of what is now Hemphill Township, Westmoreland County. Here he erected a substantial double log cabin dwelling, in which was conducted a school for the children of the Settlement and which was also used for religious services. He practiced his profession of medicine continuously and during the Revolutionary War began the erection of a stone hospital, albeit frequently interrupted by Indian raids. The building, being stout with windows heavily grated, was frequently used as a fort or stronghold. The walls are still standing. It was undoubtedly the first hospital west of the Allegheny Mountains and Dr. Marchand appears to have been the first physician outside of Pittsburgh to make a permanent location in the west. He died July 22, 1809 and his widow died in 1817, both being buried in the cemetery of the Reformed Church near Adamsburg. Their children were eight in number, three of whom were physicians, Daniel, David and Lewis Marchand. The first son, Daniel, practiced in Uniontown; the second practiced somewhere in Western Pennsylvania. A grandson, William K. Marchand, died in Greensburg and another son, John Irwin Marchand, practiced in West Newton and afterwards in Pittsburgh. Another grandson, Benjamin Rush Marchand, practiced medicine in this section, as did N. D. Marchand. Other medical practitioners of this family were Lewis, George W., Thomas S., Samuel Sackett Marchand, James I. Marchand, John Louis Marchand, Frederick Marchand and Jacob Marchand.

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[2] The record of the Marchand family is taken from Jordan, J. J., LL.D. History of Westmoreland County.

FELIX BRUNOT

Dr. Felix Brunot, born in 1752, was a surgeon of high distinction who came to America with the French troops, serving in the medical corps under his foster brother, General LaFayette. He continued in this relationship until the close of the Revolutionary War, participating in all the engagements in which his illustrious chief took part both as surgeon and soldier.

Brunot began the practice of medicine in Philadelphia but removed to Pittsburgh in 1797, where he lived to the age of eighty-six and died in 1836. When he began the practice of medicine here, Drs. Bedford, Mowry, Richardson and Stevenson were among his colleagues. Like these colleagues, Brunot distinguished himself not only as a physician, but as a public spirited citizen. He is said to have been the first physician in Pittsburgh to employ electricity in the treatment of disease. His name is perpetuated by an island in the Ohio river which he purchased and where he lived and died.

Dr. Brunot's son, Hon. Felix R. Brunot, became a wealthy man, an outstanding figure in this community, a philanthropist of most generous impulses. His labors on behalf of the Indians were recognized by several presidents of the United States by important official appointments.

DR. JOHN JULIUS LEMOYNE DE VILLIERS

Dr. John Julius LeMoyne was born near Paris in 1760, the son of a physician. Like the early pioneer physicians of Pittsburgh, Dr. LeMoyne received a careful and prolonged medical education and enjoyed the best opportunities which the Paris of that day afforded. He went through a course of seven years' study including hospital service. He began the practice of medicine in Paris and was present at the storming of the Bastille, being borne along with the crowd against his will. Joining a party of families of distinction, he fled from the cruelty of the French Revolution. He was shipwrecked on his way to this country but finally landed safely after losing most of his clothing, books and instruments.

On reaching this country, Dr. LeMoyne joined some French settlers at Gallipolis on the Ohio River. He moved to Washington, Pennsylvania, in 1797, where he settled in the practice of medicine and lived the remainder of his life, dying in 1848. In Washington he married Nancy, daughter of Francis McCully. Dr. LeMoyne was an accomplished scholar. Besides practicing medicine he took part in the affairs of the community. He accumulated a very considerable library for those days, which contained valuable books on chemistry and botany of which he was fond. His love of flowers and gardening was probably inherited from his father, who was in charge of the Jardin des Plantes in Paris.

FRANCIS JULIUS LEMOYNE

One year after their marriage, Mrs. LeMoyne bore a son, Francis Julius LeMoyne, this being the only child of the union. Dr. Francis LeMoyne was graduated from Washington College in the class of 1815 at the age of seventeen. He studied medicine in Philadelphia and became a notable figure in the community both as a physician and a man of affairs. He was a staunch defender of the negro race, and ran for Governor on the Abolitionist ticket. He also belonged to the Underground Railway, which helped many runaway slaves to escape. He gave $10,000 to start the first library in Washington, Pennsylvania, and $60,000 to a colored school in Memphis. He gave Washington and Jefferson College $40,000 to found a chair of agriculture. He became the leading advocate of cremation and was a pioneer in this field. He erected the first crematory in America. Like his father he reached a good old age, dying in Washington in 1879 at the age of eighty-one.

FRANK J. LEMOYNE

Dr. Frank J. LeMoyne, son of Francis Julius LeMoyne, was born in Washington, Pennsylvania, 1839. He entered the Medical Department of the University of Pennsylvania and immediately upon graduation entered the medical corps of the army. He was in the field and saw active service during the Civil War and was promoted through the various ranks to surgeon-in-chief, Second Brigade, Second Cavalry Division, Army of the Potomac. He was made lieutenant-colonel for conspicuous gallantry in action. After the war he practiced medicine for many years in Pittsburgh, occupying a place of leadership. He was one of the founders of the Children's Hospital, surgeon of the West Penn Hospital, chairman of the Water Commission and one of the trustees of the Magee Hospital. He died December 1, 1913.

(*To be concluded.*)

CONCERNING SOME OLD MEDICAL JOURNALS*

By W. B. HOWELL, M.D.

MONTREAL, CANADA

> The great Architect of the world hath been observed not to throw down all gifts and knowledge to mankind confusedly at once, but in a regular, parsimonious method, to disperse them by certain degrees, periods and progress of time, leaving man to make industrious researches and investigations after truth.
>
> Howell's "Familiar Letters."

THE life history of the average medical book is peculiar. When it bursts upon the world, redolent of printer's ink and fresh binding, it is to find itself the object of an attention which, however great or small, begins almost at once to decline in favor of the younger members of its species. In the short space of five years it has become out-of-date; in ten years its "way of life is fallen into the seare, the yellow leaf," and in twenty-five it has begun its career as a curiosity. At fifty, if it still exists, it is only to be found in a medical library, and in the most remote part of that, or else in the dustiest corner of a second-hand bookseller's shop. By the time, however, that it has reached the venerable age of one hundred years it has acquired an interest little realized by him whose attention is absorbed in the search for the last truth, or untruth.

A desire for information about a question of medical history led the writer not long ago into a part of the medical library of McGill University where many such centenarian volumes rest in darkness and in peace. There he came upon the first volume of the *Lancet*, published in London in the third decade of the nineteenth century. He found himself translated to a different world, one where entrance to the medical profession was through apprenticeship, where operations were done without anesthetics and without antiseptics, where mistakes in diagnosis, errors in judgment or lack of dexterity in operating were published with every accompaniment of insult and derision which malice could suggest, where nursing was done by women of the charwoman class, where the study of anatomy depended upon the activities of the resurrectionists, where cholera, typhus and hydrophobia were very present realities, where phrenology was called a science, and there still lingered a belief in the possibility of human beings undergoing spontaneous combustion.

The reports of the surgical operations at once rivet the attention. It is difficult to imagine at the present time, when even the most trivial operation is done while the patient is under the influence of some kind of anesthetic, how our great grandfathers could have been induced to submit to such tortures as are described in these yellowing pages. Nor is our respect for their courage at all lessened when we read that some formidable operation was done at the "earnest solicitation of the patient."

Rarely is there any reference to the way in which pain was borne, and then only when it was borne well. Nothing is said of the heart-rending screams, the prayers to the surgeon to desist, or the violent struggles to break free, which were the ordinary accompaniments of operations and had no other effect than to elicit, from time to time, a peevish or angry protest from the surgeon.

In those days there was no elaborate and complicated ritual connected with the worship of the god "Technique." The surgeon, when he had put on an old coat, and possibly an apron, and had seen that the patient was properly tied or held, devoted his attention to getting through his work as quickly as possible. Dupuytren in 1825, chief surgeon to the Hôtel Dieu in Paris, wore, we are told, when operating, "a dirty white apron, protecting a dirtier pair of trousers, a greasy threadbare coat and well-worn carpet slippers." According to this description, the appearance of the "bandit of the Hôtel Dieu," as Lisfranc called him, was more in keeping with his lowly origin and his small mean soul, than with his position at the head of European surgery. Assistants carried ligatures in their button holes, and were proud if their working coats were as filthy as those of their chiefs. There is a smack of primitive simplicity about the story of Robert Liston cutting a piece of wood off the operating table with his amputating knife and shaping it into a plug in order to stop the bleeding of a vessel in the bone. Again, when George IV was to be operated on for a sebaceous cyst of the scalp, Sir Astley Cooper and five of the other leading London surgeons met at the palace for the operation, but in ignorance of which of them was to perform it. Cooper was suddenly told that he was selected and remarked in dismay that he had brought no instruments. One of his colleagues, however, obligingly lent him a knife which he produced from his waistcoat pocket. In those days before antisepsis it was no uncommon thing for operations even as trivial as this, to be followed by erysipelas and death, so that when on the third day the King said: "I have not slept all night and I am damned bad this morning; my head is sore all over," Cooper pictured his reputation blasted and his practice ruined; but the symptoms turned out to be due to nothing more serious than an attack of gout.

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* Read at the meeting of the Montreal Medico-Chirurgical Society, Friday, November 6, 1925.

In the actual operating the surgeon was obliged to rely upon his own two hands, since the chief duty of the assistants was to hold the patient. A Mr. Wardrop, in a lecture reported in one of the first numbers of the *Lancet*, mentions *en passant* a hernia operation which he did on a young society lady, in her bedroom, with no other assistance than that of her maid. He also relates a case which shows that surgeons were groping after a means to make operations painless. A young woman, who was to be operated on for a tumor of the scalp, leaped from her chair at the first touch of the knife. A second attempt was made with plenty of assistance to secure her, but again she escaped. The third time she was bled till she fainted and the tumor was quickly and painlessly cut out. Another patient of the same surgeon was a general officer, who had a tumor of the jaw which he was anxious to have removed, but each time, when it came to the point, he struggled and broke away. Finally at his own suggestion he was tied down so securely that he could not possibly escape. As soon as the surgeon approached him he began to struggle frantically, but finding his efforts unavailing, he suddenly resigned himself to the operation. That it was sometimes too late for the patient to change his mind even before the operation had begun is shown by the story of one of Liston's patients, who, on being taken to the operating room and seeing the preparations, lost his courage completely and rushed screaming down the corridor. He dashed into a room, slammed and locked the door; but he was not to escape, for Liston, who was very big and strong, was after him, and bursting in dragged him back to the operating room. Not all surgeons, however, were as averse as Liston to being eluded by their prey. Mr. William Cooper, a surgeon at Guy's Hospital, and an uncle of Astley Cooper, when one of his patients bolted from the operating room, turned to the students and with a sigh of relief ejaculated: "By God! I'm glad he's gone."

This same lecture of Wardrop contains much good advice. Arrangements for an operation should be made the day before, the table or chair for the patient being selected and suitable means devised to tie him to it. It is even wise to have a rehearsal (without the leading character, let us hope). The practitioner is advised not to talk or reason with the patient during the operation, as the time for that is beforehand. Forty to fifty drops of laudanum may be given. There was an unwritten rule in the days before anesthetics that during operations there should be no kind of consultation between the surgeons, and that nothing should be said which could be interpreted by the patient as evidence of doubt or hesitation. That the rule was, however, sometimes disregarded is shown by the following incident which the *Lancet* reported as occurring during an operation at the Westminster Hospital: "On dividing the femoral artery, a jet of blood issued forth with such force as to go over the operator's shoulder. Sir Anthony Carlisle immediately jumped from his seat and screamed out: 'The artery is bleeding! Stop it for God's sake, Mr. White, or the man will die under your hands! Stop it, or he will bleed to death before our eyes . . .!' Mr. White, who was doing the operation, fortunately did not participate in the alarm of the humble knight."

The most common operations reported are the setting of fractures, reductions of dislocations, amputations, herniotomies for strangulation, lithotomies, tying of arteries for aneurysm, and the removal of tumors. The time taken over the operations is sometimes mentioned in the reports and astounds us by its brevity! Within half a minute from the time Liston began an amputation through the thigh, the leg was on the floor; Sir Astley Cooper removed a stone from the bladder in less than a minute. On one occasion Percival Pott performed lithotomy on two boys in nine minutes from the time the first was placed in position to the carrying out of the second. Syme in Edinburgh performed an amputation through the hip joint in "about a minute." Sometimes, however, such speed was impossible. On January 18, 1824, the *Lancet* reported an amputation through the hip joint by Sir Astley Cooper which occupied thirty-five minutes. There had been a previous amputation below the knee some years before, but the femur had been diseased ever since and was rapidly growing worse. The leg was removed in the space of twenty minutes; the securing of the arteries and the putting on of the dressing occupied fifteen more. The patient, who had "readily consented" to the operation, bore the ordeal with "extraordinary fortitude" and afterwards said to Sir Astley that it was the hardest day's work he had ever gone through; to which Sir Astley replied that it was about the hardest *he* had ever done. On the whole one is inclined to think that the patient spoke with the greater conviction.

The frequency of operations for tying arteries for aneurysm indicates how prevalent was neglected syphilis. On one occasion Astley Cooper tied the aorta for aneurysm of the common iliac artery, but the patient died in forty hours.

The Taliacotian operation for restoration of the nose deformed by syphilis was not uncommon, but this of course could not be done quickly, the time taken over one case being "nearly an hour" and for another two hours and a half.

From time to time cases of vaginal hysterectomy were reported. In one of these during which the patient lay across her bed, the intestines gave trouble by coming down into the vagina, but were kept in place after the operation by pledgets of lint. After a stormy convalescence, recovery took place, but a vesicovaginal fistula remained. Another patient was not so fortunate in the outcome. "She did not lose," said the surgeon naïvely, "more than two pounds of blood during the operation." On December 5, 1835, there is a report of the removal of a rectal cancer which was adherent to the vagina; hemorrhage was controlled by the actual cautery and no attempt made to sew up the wound. The writer of the report, with modest exultation, states that "setting aside the inconvenience experienced by the involuntary discharge of feces and the falling down of the womb, no untoward symptoms appeared." Caesarean sections were not uncommonly performed with success as regards both mother and child. One woman is reported to have undergone this operation three, and another four, times.

Stone in the bladder seems to have been extremely common. The pages of the *Lancet* abound with reports of operations for this disease on patients of every period of life. The most remarkable was one copied from a French medical journal. An assistant surgeon of the Royal Guard, who had suffered from childhood with stone in the bladder, and had undergone lithotomy five times, performed the operation successfully on himself before a looking-glass.

The superior thyroid arteries were occasionally tied for goiter when it caused symptoms of pressure on the trachea. For a goiter affecting the left lobe of the thyroid, displacing the trachea and causing dyspnea, Liston divided the clavicular and sternal attachments of the sternomastoid. No account of the removal of a goiter was found.

One feels that the nerve of the surgeon is almost as much to be admired as the fortitude of a woman who was operated on for osteosarcoma of the alveolar processes of both upper and lower jaws. Hemorrhage was controlled by the use of the actual cautery, "which," says the surgeon, "I further employed to destroy all suspicious looking points that remained behind." We are not astonished to read that after the removal of the whole alveolar arch of the upper jaw the surgeon found the patient in a state which he described as "pitiable," and that when the incision in the lower lip was being sewn up she fell into a "slight swoon." The courage she displayed throughout the whole operation is described as "almost incredible." It is a satisfaction to know that she recovered in spite of being bled during the first few days.

On March 5, 1836, there is a description of the removal of a tumor "as large as a moderate-sized cocoanut" from the upper jaw of a patient who had undergone two previous operations, followed by recurrences. The third operation, during which the whole of the superior maxilla and malar bone of one side were removed with the tumor, was done by Robert Liston and completed in six minutes. The surgeons of a century ago were far too enterprising to be discouraged by the mere fact that a tumor was large. There is a report in the *Lancet* of 1831 of the removal, by Charles Aston Key, a former apprentice of Sir Astley Cooper, of a tumor of the scrotum which weighed fifty-six and one-half pounds. The patient was a Chinaman named Hoo Loo who had come to England to find out if anything could be done for him. The operating theater at Guy's Hospital having been found to be much too small for the hundreds of members of the medical profession who wished to be present, arrangements were made at the last minute to use the anatomical theater which had a seating capacity of six hundred and eighty.

> In about a quarter of an hour Hoo Loo entered, accompanied by two nurses and a *posse comitatus* consisting of the various functionaries of the hospital and in a few minutes he was secured to the operating table. . . . A short consultation now took place between Sir Astley Cooper, Mr. Key and Mr. Callaway, during which it was finally agreed that if it were possible, the genital organs should be preserved. . . . The face of the patient was then covered and Mr. Key, taking his station in front of the tumour, commenced the operation.

The operation was finished, but not without sacrificing the genital organs, in one and three-quarters hours.

> This tremendous protraction was chiefly occasioned by the intervals which were, from time to time, allowed the patient for recovery from the fits of exhaustion which supervened. Complete syncope occurred twice, and during the whole of the latter steps of the operation he was in a state of fainting. . . . The fortitude with which this great operation was approached, and throughout undergone, by Hoo Loo, was, if not unexampled, never exceeded in the annals of surgery. A groan now and then escaped him, and now and then a slight exclamation, and we thought we could trace in his tones a plaintive acknowledgement of the hopelessness of his case.

We are not surprised to read that in spite of stimulants and the transfusion of six ounces of blood from the arm of a student the patient died a very short time after the operation.

Cancer of the breast was probably as common then as now. Sir Benjamin Brodie is quoted in 1830 as speaking of this disease in these terms:

> Surgeons formerly were very ready to amputate any woman's breast which had in it a scirrhous tumor and now they are very careful how they amputate. I suppose that I do not recommend the operation for scirrhus in the breast in one case out of three score . . . and even in those cases in which I recommend amputation the operation has much more frequently failed than succeeded, even with all my care.

When Thomas Wakley started the *Lancet* in 1823, Sir Astley Cooper and John Abernethy were the two leading surgeons and teachers of surgery in London. Without permission from either of them, Wakley published full reports of their lectures for the benefit of the students and the profession at large. Cooper did not object particularly. Abernethy, however, was highly incensed and tried lecturing in the dark, but his words were just as carefully recorded by the unknown reporter. His objections were partly due to fear of ridicule since his peculiarities of style were published with merciless accuracy. He is reported as saying in one of his lectures, "Ho, he had his jawing tacks on board, as a sailor would say"; and about some food eaten by Cornaro, the "Noble Venetian": "Why it played the devil with Cornaro's guts." Lecturing on erysipelas he protests: "I'll be hanged if erysipelas is not always the result of a disordered state of the digestive organs; egad, it is a travelling disease . . . if it is seated in an unimportant part, in the name of God, let it go on there."

The description, written by one who had been his pupil, of Abernethy slouching into his lecture theater with his hands in his breeches' pockets, puffing out his cheeks, or whistling, and then throwing himself into his chair to deliver his lecture, with one leg over the arm, brings the unconventionality of the man vividly before us. Yet however insouciant his bearing may have seemed, he was so shy that there were times when he had to withdraw immediately after his arrival in order to recover his composure.

The rough manner for which he was notorious seems to have been partly due to shyness and partly to a nervous irritability which he was never able to master completely. Although he was often rude to his private patients he was always consideration itself to his public ones. "Private patients," he once said, "can go elsewhere, but the poor devils in the hospital I am bound to take care of." Sir Astley Cooper used to say that he owed £1000 a year to Abernethy's rudeness to his patients. The affectionate regard in which he was held by his students was based on their appreciation of his honesty of purpose, his genuine benevolence, his hatred of humbug and his unworldliness, as well as on the excellence of his teaching and his devotion to their interests. Not even on the day of his marriage, nor, many years after, on that of his daughter's, did he fail to give his usual lecture at St. Bartholomew's Hospital. No amount of familiarity with suffering, in an age when callousness came very nearly being a virtue in a surgeon, ever hardened Abernethy. He looked upon operations as evidence of failure in medical science, and would have nothing whatever to do with experiments on animals.

That he was not alone among surgeons in his aversion to operating is suggested by the following statement quoted by the *Lancet* in 1825 from a speech of Sir Anthony Carlisle at Westminster Hospital: "A very eminent surgeon of London, a man of very large practice, of great experience and no less ability, told me before his death, that he had never performed an amputation, and only one cancerous breast had he extirpated."

Cooper, who was at the height of his fame, had obtained his appointment to the staff of Guy's Hospital through having been an apprentice of Cline, but his gifts as clinician, teacher and writer entitled him to his position and his success. His handsome person, his charm of manner, his high spirits and his imperturbable good humor had made him one of the most popular men in London. His private practice, according to his biographer, was so large that during his consultation hours, which occupied all the morning, six rooms in his house had to be devoted to the accommodation of himself and his patients, besides the hall which was generally crowded with servants and messengers waiting with notes from their employers asking for appointments. One of the rooms was for patients who, having undergone some small operation, were put there to wait until they had regained their mental equilibrium and were in a fit state to go out into the street, or until it was time to return for a second séance in the consulting room. His nephew and biographer, Bransby Cooper, gives an amusing description of the occupants of this room, when as a boy he used to peep in and see them, limping restlessly about, rocking themselves to and fro, groaning and grimacing, and comparing notes with one another. The butler, Charles, was a character hardly less well known than his master. It was he who arranged the order of admission into the great man's presence, and a very good thing financially he seems to have made of it. It was he who had to pacify the patients still waiting, when his master bolted, as he generally did, punctually at one o'clock, and often by the back door. Cooper had what he called a dissecting room, but which was chiefly a pathological laboratory, over the stables at the back of his town house, where he began the day's work at six o'clock, summer and winter. So keen was he to work in it that sometimes when he gave a dinner party he arranged to have his butler pretend to bring him an urgent summons and he would disappear into the dissecting room, leaving one of his apprentices to take his place at the head of the table. That his happiness was never complete without some professional work to do is shown by the fact that he had another dissecting room at his country estate at Hemel Hempstead.

Another name which ranks in interest with those of Abernethy and Astley Cooper is that of Liston. It does not appear with any degree of regularity in the *Lancet* until 1835, when he came to London from Edinburgh at the age of forty-one, having been appointed surgeon to the North London Hospital, and professor of surgery at University College. Tall, strong and handsome, with a rough manner and an irascible temper, he quickly became a conspicuous figure in medical circles. He was undeniably the most dexterous and resourceful operator in Great Britain. In the beginning of his career as a surgeon in Edinburgh he had been forbidden to enter the Royal Infirmary partly because of his outspoken contempt for the surgery practiced at that institution, and partly because he was suspected of luring patients away so that he could operate on them himself. This prohibition kept him out of the Infirmary for five years, during which, however, he did a great deal of operating on poor people in their own houses or in lodgings which he himself provided. He removed the scapula, for the first time this operation had been performed in Great Britain, "in a small badly lighted room." He successfully removed, also in a private house, a tumor weighing forty-four and one-half pounds, from the scrotum of a patient with elephantiasis. At the end of the operation the patient, we are not surprised to hear, was in a state of collapse, so "a cordial (good strong whiskey) was poured into the stomach . . . and before much signs of recovery could be observed he had taken one pint of it." The nationality of the patient is not mentioned.

Liston looked upon the tourniquet as a useless and harmful device. "I have repeatedly," he wrote, "when no proper assistance was at hand, compressed both the femoral and the humeral arteries with the fingers of one hand, whilst with the other I removed the limb, and with the loss of much less blood than if I had followed the ordinary mode." Such a feat required uncommon strength of grip, for it must be remembered the patient would almost certainly have been struggling. It was Liston who was the first in England to perform a major operation under ether anesthesia. His attitude towards this discovery seems to have been one of scepticism, but when the patient, whose leg he had just amputated, woke up in the operating room and said "When are you going to begin? Take me back, I can't have it done," he was convinced and exclaimed: "This Yankee dodge, gentlemen, beats mesmerism hollow." Liston died in 1847 at the age of fifty-three, from aneurysm of the aorta, which was supposed to have been caused by a blow on the chest from the boom of his yacht.

Surgery must inevitably have had a certain brutalizing effect on medical students and practitioners. It must be remembered that a surgeon before the days of anesthesia was a man to be pointed out in the streets with the same kind of shuddering interest that would now be directed towards the public hangman. Here is an example of a degree of callousness to which in a more humane age we are quite unaccustomed:

> Mr. Chevalier kept the urethra distended for three and a half hours in a girl of small stature and of feeble habit, with stone in the bladder. "The pain," he said, "was as severe as well can be conceived, being as violent as any bodily suffering I every saw under any circumstances and altogether without remission!" Mr. Chevalier was very strong on the danger of dilating the urethra in the female too quickly.

It must not be inferred that the philosophical attitude of the surgeon towards his patient's pain supported him to any great extent when he himself was the sufferer. Astley Cooper, when he broke his leg, would not let his colleague Travers touch it, and Cline after an accident was quite without any scientific curiosity about the exact number of his broken ribs. He said he knew that some were broken, but the same bandage would do equally well for one as for half a dozen. When Percival Pott was thrown from his horse and sustained a bad fracture he refused to be moved and remained lying in the street, although it was mid-winter, until his servants were sent for and suitable means arranged for his removal. Such care in avoiding pain makes one wonder if the golden rule might not be profitably incorporated with the science of therapeutics.

In a report of a case of hydrophobia at Guy's Hospital it is stated that the patient was subject to the most agonizing spasms as a result of even trivial causes, such as a sudden gleam of light or draught of air. A certain Dr. Blundell, one of the physicians of the hospital, entered the room with a large number of students and after feeling the pulse leaned forward suddenly and blew in the patient's face. "Which caused him," says the report, "to start up in great agony and to express himself very severely against the doctor for the torture to which he had put him." Dr. Blundell said he was perfectly satisfied as to the nature of the disease and that that single circumstance might be considered sufficiently pathognomonic. The patient was afterwards bled forty ounces till his pulse, which had been 84, rose to 160. The effect of this was to throw him into a state of "ungovernable excitement and restlessness." An attempt was then made to give him an intravenous injection of water, but without very great success, partly on account of his restlessness, and partly owing to the fact that kindly death intervened between him and his medical attendant.

This Dr. Blundell occupied the chairs of physiology and midwifery at the united hospitals of Guy's and St. Thomas'. That he was not handicapped by any oversensibility may be inferred from the fact that he was much given to experimenting on living animals, be it remembered, without anesthetics. As a result of his studies in experimental surgery he advocated operations which had been considered impracticable, such as the sewing up of a ruptured bladder, division of the Fallopian tubes to produce sterility in deformed pelvis; oophorectomy for dysmenorrhea and menorrhagia; and hysterectomy, both for cancer and as an alternative measure to cesarean section. His studies in transfusion of blood in animals led him to use it in human beings. Though he had a large practice it was his habit to lie in bed till midday (as will be surmised, he was a bachelor), to see patients at his house till six o'clock, then have dinner, and go out and make his rounds. His carriage was a familiar sight for many years in the streets of London. It was a large yellow chariot which occupied so great a part of his affections that when it was no longer possible to repair it, nearly all the original parts having at some time been replaced, he discharged his coachman and went on foot. Perhaps it was the original "one hoss shay." That he was not entirely unsuccessful as a practitioner may be gathered from the fact that at his death his estate was valued at £350,000, most of which he himself had earned.

When we read in the numbers of the *Lancet* the reports of cases of hydrophobia we understand the terror with which this disease was regarded. There seems sometimes to have been a curiously dramatic element in the onset of the symptoms. In one case the patient, who had been bitten by a dog six weeks before, was at breakfast and was apparently feeling quite well:

> When his wife, on pouring him out a basin of tea, perceived his countenance to undergo a remarkable change. He pushed his chair violently back, started up instantly and clung to the mantel-piece for breath, and displayed a degree of horror at the sight of fluid on the table, wholly indescribable. . . . At 12 noon on the same day he was seated in an armchair, displaying an appearance of sullen dejection, I endeavoured to gain his confidence by language of a soothing nature and by zealous attention I succeeded in my wishes. On learning the history of the case I felt no hesitation in pronouncing it to be, in my opinion, a confirmed hydrophobic attack. *I had some difficulty in making my patient believe it, and more so in enlightening him to a sense of his extreme peril.* . . . He told me he felt an extraordinary sensation in rising from his bed in the morning and, going to the glass to shave himself, he felt so alarmed at the appearance of a horrid face looking over his shoulder that he could not hold the razor to his chin.

It is difficult to understand the motives which led the medical attendant to take such pains to enlighten his patient as to the awfulness of his fate. Was it, perhaps, the custom to give patients about to die warning of their danger so that they could attend to their spiritual welfare, or was it mere stupidity? This case was treated like the other by bleeding.

In the report of a case of hydrophobia in a child the writer says:

> The treatment I adopted in this case consisted in bleeding, the use of opium, croton oil, calomel, etc., variously combined, turpentine enemas, and lastly the internal exhibition of strychnine in quarter of a grain doses, which were ordered to be repeated every alternate hour for three doses, but the poor fellow did not live to take them. He died in great suffering fourteen hours from the time at which I first saw him. It might be well to mention, that for two hours preceding his dissolution he spoke nothing scarcely but bloodshed, frequently calling for his knife in order that he might annihilate those who had, in his perturbed imagination, been the cause of his sufferings, and amongst that number I was very particularly included.

Doubtless it was his youth, ignorance and suffering which prevented the patient realizing with gratitude that the doctor was conscientiously doing all he could to bring the disease to as early a conclusion as was consistent with the law. "Vitaque cum gemitu fugit indignata sub umbras."

It is difficult for us to realize the extent to which bleeding was carried. It was a more or less important part of the treatment of nearly all diseases and injuries. It would seem as if, in the opinion of the medical world, the chief function of the blood was to provide an excuse for venesection. No less a personage than George IV, when he was unable to attend the death bed of his father, on account of a cold, was bled eighty ounces and "might have died even then from a relapse if he had not been bled another fifty ounces." However, the loss of one hundred and thirty ounces of blood was not very serious to a man with the dimensions of Beau Brummell's "fat friend."

Under the heading "Foreign Department" is the report of a case of a French sergeant who had been wounded in the carotid artery near its origin. "A copious haemorrhage of arterial blood followed, which produced in a short time, a state of complete syncope." When seen an hour afterwards "he was very pale and feeble; the pulse was very weak and irregular; the pulsations of the heart were very strong and extended. . . . The patient was placed in bed. . . . He was immediately bled from the arm to the extent of twenty ounces." Pressure was maintained in the wound by relays of students. Next day seventy ounces of blood were withdrawn in seven bleedings, and the day after, twenty-four ounces. Between the third day and the seventeenth only fifty-six ounces were taken. In spite of all this bleeding, of recurrent hemorrhages from the wound, of the frequent applications of leeches "aided by the sedative effects of digitalis given in much larger doses than have been tried in this country" he recovered.

In Clutterbuck's "Lectures on Blood-letting," which was published in 1839, when the Golden Age of bleeding was coming to an end, there is a footnote which reads as follows:

> For examples of boldness in the use of the lancet, I may refer you to the practice of some of our surgeons. In one of the great hospitals of the metropolis a case occurred lately where 128 ounces of blood (8 pounds or 1 gallon) were drawn at one time in order, by inducing syncope, to facilitate the reduction of a dislocation of the thigh. The patient lived a week afterwards, and then, as is said, died from inflammation of the vein punctured.

It is interesting to read in the "History of Saint Bartholomew's Hospital" that during the year 1837 no less than 96,300 leeches were used.

There were no "therapeutic nihilists" a century ago. A young man suffering from pneumonia, we read, is bled fifty-two ounces in the first two days of his illness. "That pink of apothecaries, Master Whitfield," says the *Lancet*, "instead of bleeding him again actually directs twelve leeches to the side with small doses of sulphate of magnesia and antimonial wine!" Next morning a certain Dr. Elliotson takes charge and directs a vein to be opened. More than twenty ounces are abstracted and the patient expresses himself as "much relieved." A large blister is then applied to the side and he is given a dose of ten grains of calomel which is to be repeated every two hours. Two grains of opium are ordered to be given "at bedtime." By next day the unfortunate young man had taken four scruples of calomel "but the mouth is not at all affected." More blood is let and it is found to be "buffed and cupped." One is glad to know that the patient recovered.

A free loss of blood during an operation was looked upon as salutary. Mr. Wardrop says: "The number of recoveries from operations is usually in proportion to the quantity of blood lost during the performance. In all operations where the patient loses a considerable quantity of blood there is generally the least subsequent inflammation of the wound. Inflammatory signs in the wound should be treated by bleeding to the 'full extent,' not merely till the pulse is reduced but until it is imperceptible at the wrist, or until syncope takes place." It is a humiliating thought for us that some of the greatest advances in medicine have been made by abandoning time-honored methods of inflicting harm on the sick.

The writer was at first astonished and puzzled at the malignant spirit in which the mistakes and shortcomings of the leaders of the profession were recorded in the *Lancet*. The explanation is to be found in the biography of the editor by Squire Sprigge, which records his fight against an iniquitous system which allowed the promotion of incompetent men to important hospital and teaching positions through nepotism and purchase.

In one of the very early numbers of the *Lancet* we read that "a man has just expired in St. Thomas's Hospital on whose body an attempt was recently made to tie the subclavian artery. The miserable man was under the hands of the operator nearly four hours." Another case to which the *Lancet* drew special attention under the heading: "St. Bartholomew's Hospital—Extraordinary operation—Death," was that of a child of seven years of age who was supposed to have a nail in his ear. He had to be held by several assistants before he could be examined. "A probe was passed 'about an inch' into the ear and could be 'distinctly heard to strike some metallic substance which appeared to be firmly impacted in the tympanum . . . !' Several pairs of forceps were successively introduced and with each of them the piece of nail was taken hold of, but could not be extracted." The attempt was now abandoned for the time being. Six days afterwards the child was "apparently well, with no pain in the ear or head, though there was a discharge of pus." A few days later he was operated on again by a Mr. Earle. Nothing is said of how many assistants were necessary to hold him this time, or of the terror which the prospect of a second bout of torture must have aroused in his mind. The surgeon introduced a director into the meatus "which he used with so much force that he bent it; dressing forceps were then employed, with which he laid hold of the nail and pulled so forcibly that he bent them also." Further attempts were made, the only result, besides inflicting pain and injury, being to damage the instruments used. "The nail," says the *Lancet*, "could not be moved though Mr. Earle exerted great strength." An incision was then made parallel to the posterior part of the ear and the external auditory canal was divided. "Forceps of different kinds were repeatedly introduced, but they were either bent, or slipped their hold . . . a pair of tooth forceps was next employed, and after laying hold of the nail . . . and pulling very forcibly, the surgeon at length succeeded in extracting three pieces of metal which appeared to be portions of the head of the nail." After an hour of these well-meant efforts Mr. Earle "called for a pair of wire nippers for the purpose of cutting the nail in two, but some gentleman observed that they would be too large to be introduced into the tympanum." The end of the operation came when the operator had to acknowledge that he did not know where the nail was. The child was now found to be "nearly exhausted," and was sent back to the ward, where he died a few days later. At the post-mortem examination considerable destruction of the bone was found but there was no sign of the nail. One wonders if the "three pieces of metal" were not parts broken off instruments.

Of this Mr. Earle Sir James Paget wrote in his "Memoirs": "He was a very amiable and well-cultivated gentleman, careful, ingenious, inventive, always studious, and always ready for what was new, looking for new things, new instruments, new means of cure, and using all things with moderation. For care, gentleness, neatness and all mechanical and minor surgery, he was an excellent model." One cannot help feeling that although his method of removing from a child's ear a nail which was not there might have been described as "new," it could not, with any degree of accuracy, be said to be characterized by either "gentleness" or "neatness."

There was a certain Mr. Joe Burns, surgeon to the Middlesex Hospital, to whose shortcomings Wakley drew attention with remorseless persistence. The following is an example of the treatment accorded to "Sapient Joe" as he is spoken of in one place. "Another splendid illustration of the celebrated Joe Burns's surgical abilities occurred at this hospital a few days since in the operation of trephining. It is scarcely necessary to say that the patient is dead." Elsewhere we are told that "according to a most acute observer the famous J. B. is a complete specimen of the bullying surgeon. With small skill in surgery and no learning he got into a hospital by vile arts; he is surly and morose; treats his patients like dogs." In a description of an operation for scrotal hernia by this gentleman, Wakley says: "It was really melancholy to observe the little latitude his colleagues allowed him for the discharge of his powers; for in point of fact they did everything they could to prevent the old baby from making any cut without their sanction." In another number under the heading, "The Middlesex Hospital and the Surgery of Joberns," there is a harrowing account of a strangulated hernia treated with repeated attempts to reduce it, though horribly tender, by taxis, hot baths and bleeding. This treatment was only discontinued when the skin was "black and blue and in places blistered." Finally as a last resort the patient was operated on twelve hours after admission and died. "It is a melancholy fact," the *Lancet* continues, "that for upwards of two years not more than one patient has recovered from the operation for strangulated hernia at the Middlesex Hospital." This very plain speaking led to an inquiry by a special board of governors of the hospital at which it was stated that the surgeons did not know that the case was one of hernia. "Why then," asks the *Lancet*, very pertinently, "did they so indefatigably employ taxis?"

If Wakley had had more clinical experience he would have appreciated the difficulty in diagnosing some abdominal swellings; and perhaps been less facetious in his account of the following case:

> There has been another highly interesting case at this hospital, of the hydraulic species, the particulars of which we give in a subsequent number. We were informed that it was a case of ascites, but the water, by some miraculous power, suddenly became converted, not to urine, but a fine chopping boy who took the liberty of leaping into the world about half an hour previous to his intended passage through the canula of a trochar.

Wakley was no more lenient in his book reviews than in his reports of hospital practice. Of a book on Colchicum he says, "a great part of the book is composed of unintelligible verbiage. The word 'drachm' is spelt without the ch. It does not augur good taste in a physician to borrow terms from a gin shop." The review ends with the statement that "the book is the finished perfection of dulness and obscurity." In another review this statement is made: "For all Mr. Wallace's ravings, he has invariably given the most conclusive evidence of an incapacity both for medical discovery and literary composition."

When Bright and Addison published conjointly their "Elements of the Practice of Medicine" they obtained no approval from the *Lancet*. Among other disparaging remarks the reviewer said: "Their theory of fever is derived from others whose principles require no exertion of ours to hurry into oblivion. . . . We constantly find in this work that a violent, coarse, and harrowing mode of treatment is generally recommended."

In reporting the Hunterian oration for 1825 given by a Mr. Norris, attention is drawn to the orator's very indistinct and slovenly articulation. "The only word," says the *Lancet*, "which characterizes the oration is 'twaddle.'" Yet this "twaddle" seems to the reader of today to contain a good deal of common sense. Wakley was guilty of more than doubtful taste in some of his attacks. He called English hospital surgeons "bats," Scotch ones "dubs" and gave individuals whom he selected for his special disapproval, nicknames such as "owl," "cocksparrow," and "oyster." Some of his personal allusions were undoubtedly redeemed by their drollness; for instance when a certain Dr. James Johnson changed his place of residence the news was published under the heading: "Pathological Intelligence—Metastasis of an Extraordinary Fungus."

That Wakley's asperities did not always cease with the death of his victims, is shown by the following extract from an obituary notice headed "The late Dr. Warren." "He was constantly taking snuff, indulged freely in the juice of the grape, and like all sensualists, was slovenly in his appearance. He was laconic in his discourse and somewhat coarse in manner, and to many was by no means a pleasing personage. . . . Dr. Warren had that due contempt for anatomy and pathology which becomes those individuals who assume to occupy the 'highest grade' in the profession and during a period of twelve years during which he officiated as one of the physicians of St. George's Hospital he used to boast that he had never once been in the dead house. Sir Benjamin Brodie in confirmation of this discreditable fact, narrates, with that satyrical simper in which the pure surgeons indulge when speaking of their still purer brethren in Pall Mall East, the following anecdote:

> One day, when Warren was waiting in the board room of St. George's Hospital, to know the result of a post-mortem examination that was going on in the dead room, he became impatient and while warming his coccygeal region at the fire, addressing himself to a colleague, who was near, said, 'This d. . . .d morbid anatomy will spoil the practice of physic.'"

One is struck with the frequency of Latin quotations in the articles written by outside contributors. The time devoted to the classics at school was proportionately much greater a hundred years ago than it is now and indeed, it must be remembered that a medical education then included an examination in Latin, in Celsus' "De medicina." English seems to have been considered a language quite inappropriate in prescriptions. The directions for the treatment of a patient, who after a fall on the head had a headache and a pulse of 50, "rather full," are: "Capiatur—Haust sennae co. Secundis horis donec alvus dejiciat. Admoveantur—Cucurbitulae cruentae nuchae ad ℥x." By the next day as a result of this classical treatment the headache being better, and the pulse 44 and only "rather full," leeches and a lotion are resorted to, with the few simple instructions: "Hirudines viginti capiti raso et postea Lotio Ammon. acet. assidue applicand." A woman suffering from the effects of hemorrhage due to placenta praevia is given castor oil with the directions "℥ss tertia q. q. hora, repetend donec plene respondent alvus"; and when the window is opened it is only in obedience to the injunction: "Admitt liberimme aer gelid."

It is not likely that there was a version in English for the benefit of the nurses since it would have been wasted on most of them for there were few who could either read or write. It is difficult to imagine those ornaments of the nursing profession, Mesdames Gamp and Prig, handicapped as they were by the lack of a sound classical education, devoting much of their time to translating directions written in Latin. Their powerful minds were much too occupied with their "shilling's worth of gin and water," their "pickled salmon" and their "cowcumber" to waste time in trying to understand directions which the doctor had taken special pains to render obscure by writing in Latin.

In one of the earliest numbers of the *Lancet* there is the report of a case of syphilis in a young girl in the Magdalen Ward of St. Thomas' Hospital which is written throughout in Latin. Why this particular patient should have been so favored it is hard to imagine, since the privacy of other unfortunates was little respected, the names being given in full, and to prevent any possible mistake in identity, the age, place of residence and occupation as well.

During the second year of the *Lancet's* existence one of the greatest advances in medical science was heralded by the announcement of the invention of the stomach pump. The first reference occurs in November, 1824, among the "Hospital Reports," where we read:

> At half past one o'clock, the operating theatre (at Guy's) was crowded to excess in consequence of its having been stated . . . that some experiments were to be tried on a dog this day, for the purpose of ascertaining whether liquids could be put into the stomach and removed from it by means of an instrument which had lately been invented by a Mr. Reed of Hosmondon, Kent.

A drachm of laudanum in four ounces of water was given to the dog and after thirty-three minutes removed from the stomach. The Mr. Reed mentioned was a gardener. His invention, when he first showed it to some medical practitioners in his neighborhood, was received with derision, but later he came to London and explained it to Sir Astley Cooper, who at once recognized its possibilities. Reed afterwards invented a number of other instruments for use in human and veterinary surgery.

Even the advertisements in the old numbers of the *Lancet* are full of interest. Here we find particulars concerning the different private anatomy schools, Brookes', Grainger's, Dermott's and Carpue's. The names associated with them are those of men with high scientific attainments and eccentric personalities. They competed keenly with one another as well as with the hospital teachers. Much of their success depended on their keeping in favor with the resurrectionists, upon whose good will and caprices they depended for their supply of subjects. The houses occupied by the schools were for the most part built for other purposes than teaching, and were ill-lighted and ill-ventilated. When we consider the gloominess of the usual winter day in London, we may take it for granted that the dissecting rooms were lighted even during the day with gas or candles, the latter evil-smelling and requiring frequent snuffing. However, the vitiation of the air by artificial lighting probably escaped observation at a time when the means of preserving bodies was very little understood. There is something unconvincing about the reiteration in these advertisements of the statement that "the inconveniences usually attending anatomical investigations are counteracted by an antiseptic process," and our suspicions are confirmed when we read in a letter to the editor that "charcoal powder blended with, and sprinkled over, putrid portions of a subject under dissection, will, in the course of a night, in great measure remove the offensive effluvia. The hands of the students rubbed with charcoal before washing them will dispel the usual stench of dissection." The following is an extract from another letter to the editor:

> I do not hesitate to appeal to you upon a subject which may appear to some to merit little notice, but to me and to many of my fellow students is an intolerable nuisance. I allude to the filthy state of some of the anatomical schools, but more particularly the one in Little Windmill Street. Upon entering the dissecting rooms, the museum, etc., the nose is assailed by a "compound of villainous smells," not to be described. Is this to be wondered at, when putrid animal matter may be seen in every corner dragged by the rats (which abound in the building) even from the dissecting tables?

Dissecting was not limited to anatomy schools and hospitals in the days before the passing of the Anatomy Act in 1832. Astley Cooper, when he lived with Cline as his pupil, kept a subject in a room at the top of his master's house where he and a fellow apprentice dissected, until one day they found they were being watched by some workmen on a neighboring roof.

At that time feeling against the desecration of graves by resurrectionists was so strong that it was no uncommon thing for mobs to make hostile demonstrations against places known to be used for anatomical purposes. For the sake of prudence the subject was removed to the apprentice's sitting room and kept there; no doubt much to the gratification of Mr. Cline's family, whose opinions of the matter have not been preserved in history. Possibly wives and servants were better disciplined than they are now. That this was not an isolated case of dissecting in a private house we conclude from finding the following advertisement in the *Lancet:* "Consulting surgeon, residing at a convenient distance from St. Bartholomew's and the Borough Hospitals, has vacancies for two pupils to live in his house. He has a private dissecting room."

The best known private anatomy school was one in Blenheim Street kept by Joshua Brookes, who had been made an F. R. S. in recognition of a method he had invented to preserve anatomical specimens, and who had achieved a European reputation as an anatomist and teacher. For forty years, during which more than five thousand pupils obtained their tuition in anatomy and physiology from him, he passed most of his working hours in his dissecting room and museum. Upon the latter, which contained a unique collection of specimens of human and comparative anatomy and pathology, he spent no less than £30,000. His constant indulgence in snuff taking, a habit for which he had an inordinate fondness, might have been interfered with by his occupation had he not been one of the dirtiest of men. Grainger of the Webb Street School, who had commenced his career as a teacher of anatomy by renting an attic in the house of a tailor, owed much of his success to his efficiency in keeping his pupils supplied with subjects, which he did by out-bidding his rivals with the resurrectionists. Another school was kept by J. C. Carpue whose name appears in Tom Hood's verses on the resurrectionists.[1] At the age of eighteen he had set out to tour the Continent on foot, and was in France before and during the Revolution. He had seen Phillipe Egalité waiting on Louis XVIII and Marie Antoinette, and he had listened to the speeches of Danton, Marat and Robespierre. Perhaps he experienced enough excitement during his travels in revolutionary France to last him for the rest of his life. At all events on his return to England he settled down peacefully and, for thirty years, taught anatomy daily, except for a short respite each summer. G. B. Dermott, whose school was in Soho, had been a favorite pupil of Brookes. An excellent anatomist, honest, unpretentious and industrious, he was ambitious to succeed in surgery, but probably owing to some lack or fault in his personality, he was never able to build up a practice. He was a devoted student of Shakespeare, and when during his two hour lectures he noticed any flagging in the attention of his class, was in the habit of stopping and reciting passages from his favorite author. For some years before he died he gave a great deal of his attention to a scheme for erecting a colossal statue in iron near the mouth of the Thames as a national monument to Shakespeare. Being hospitably inclined he used, from time to time, to give parties for his pupils at his house, where they smoked and drank punch. It was his custom on the arrival of guests to caution them against drinking too much, and when they left to tell them that in the event of any trouble with the watch, to be sure and send for him if they needed bail. After his guests had left he stayed up, well knowing that he would be sent for.

This was before the days when benevolent boards of governors, concerned with the physical and spiritual welfare of students, had instituted social clubs for them and provided recreation grounds. The social centers for the medical students were the dissecting rooms and the taverns. History relates that between the dissecting room at Guy's and a neighboring tavern, the "Ship and Shovel," there was, during most of the day, a continual passing to and fro of individuals carrying pots of "half and half." In the taverns the students could be sure to hear the latest gossip of the prize ring, the racing stable and the cockpit. From there they could start off for Newgate, supplied with well-filled case bottles and sandwiches in time to get a good position from which to watch the public executions; not that there was any novelty to a medical student in observing the expression of terror in the human face, since that emotion could be just as well studied in patients in the operating room as in felons on the scaffold.

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[1] I can't tell where my head has gone
But Dr. Carpue can.
As for my trunk, its all packed up
To go by Pickford's van.

It must be remembered that at this time entrance to the medical profession was through apprenticeship. There were two distinct classes of practitioners, the leaders and the rank and file. The former held the hospital appointments and handed them on to the men who had been their apprentices and who had paid large sums of money for living in their houses and studying under them. The appointments, it is true, were made by the governors of the hospitals, but the physicians and surgeons were usually able to exert enough influence to secure them for their nominees. The examiners and lecturers of the Royal College of Physicians and the Royal College of Surgeons were appointed from the members of this charmed circle. The teaching positions were very lucrative, as the students' fees were high. The rank and file had little hope of rising from obscurity, since hospital and teaching positions were not for them. As apprentices to apothecaries, and surgeons doing general practice, they served in their master's shops, helped with the practice, and added to their scanty pocket money by keeping the fees which they collected from the poor patients for bleeding them and drawing their teeth. If the apprentice was fortunate in his master, he acquired an accurate knowledge of medicines, of the methods of making and dispensing them, and of keeping accounts and managing a practice in a business-like way. If he was unfortunate, he learned very little, most of his time being wasted in doing work which in no way prepared him to practice his profession. In a letter to the editor of the *Lancet*, an apprentice, complaining of his lot, says: "It is the custom of many general practitioners who dispense to employ their pupils in the menial office of taking out the medicine. . . . I have to walk out with the medicine, exposed not only to the insolence of servants, but also to the jeers of my more fortunate companions." The last year was spent in "walking the hospitals" in some large city and in preparing for the examination of either of the Royal Colleges, or of the Society of Apothecaries. The licentiates of the last named were supposed only to dispense medicines, but in reality prescribed them as well. A large number of the family practitioners were nothing more than apothecaries. To obtain a license to practice, evidence of having served an apprenticeship and of having paid fees to the examiners for attending their lectures or hospital practice, was necessary, but any real evidence of knowledge which would fit the student to practice was quite a minor consideration. The examinations were carelessly conducted, no precautions, being taken against impersonation. Under such a system there could be no incentive to ambition for the rank and file, so that much of the students' time was spent in idleness and dissipation. Dickens was guilty of no very great exaggeration when he drew the characters of Ben Allen and Bob Sawyer, whom he described as having "that sort of slovenly smartness and swaggering gait, which is peculiar to young gentlemen who smoke in the streets by day, shout and scream in the same by night, call waiters by their Christian names, and do various other acts and deeds of an equally facetious description."

It was with the purpose of reforming medical education that Wakley set himself to expose the shortcomings of those members of the hospital staffs whom he considered incompetent. One cannot read in his biography the story of the dramatic events which turned him from private practice to organizing and editing the *Lancet*, without being convinced that the early misfortunes, lifting him, as they did, out of obscurity into the glare and publicity of the fight for reform, were a blessing in disguise. No man was ever more certainly intended by Providence to tread the thorny path of the reformer. He had inexhaustible energy and pluck, a profound compassion for the weak and suffering, a hatred of injustice and perhaps a certain enjoyment in stirring up hostility to himelf in a good cause.

> Eh! bien! oui, c'est mon vice
> Déplaire est mon plaisir. J'aime qu'on me haisse.

It was perhaps well for him that he was big, athletic and knew how to use his fists.

Wakley insistently demanded justice for the ordinary medical student, who in spite of paying exorbitant fees was treated with carelessness and indifference by his teachers. The following is an example of his methods and is taken from an article in which he attacked the custom of allowing the pupils of hospital surgeons to stand on the floor of the amphitheater during operations:

> On Tuesday last, an operation was performed at this hospital for chimney sweeper's cancer. The area of the theatre was, as usual, crowded with persons who had nothing to do with the operation and whose heads and shoulders effectually hid the patient from the mass of students who had assembled in the amphitheatre portion of the room. . . . Amongst the intruders in this area was a brand new dresser of Mr. Morgan, who, filled with the consequence of his "fifty guinea office," and strongly marked with the swaggering airs and bragadocia which those unhappy students acquire who spend their nights at taverns . . . determined to set the pupils at defiance during operations and freely boasted that he would occupy a place in the area, object who might amongst the *canaille* behind, at the same time intimating his intention to give a d. . . .d good licking to any student who would afford him an excuse for so doing. . . . He was conspicuous among the intruders. The customary outcries were raised in the theatre. No one out of the area could witness a step of the operation. The surgeons took no notice of the complaints . . . Mr. Dresser appeared to make it his especial business to put his head in the way. Just behind was a Mr. Pupil . . . to whom Mr. Dresser's head was particularly offensive. With sufficient politeness he begged that the block might be removed a little, but no attention was paid to this request, which was a second time made in vain. . . . The operation ended, Mr. Dresser in the lobby stopped Mr. Pupil.
>
> "Did you mean to inthult me, thur, in the theatre?"
>
> Mr. Pupil. "Certainly not. If I touched you too hard, Rathill, I'm sorry for it."
>
> "Well, thur, if I didn't know what you were I'd teach you by a thummary prothess what it ith to inthult a drether."

The discussion ended in a fight in which the heavyweight Dresser was properly thrashed by the lightweight Pupil. Sir Astley Cooper, who happened to be present, begged that they might be allowed to fight it out.

In a letter to the editor which was published under the title: "Abuses at St. George's Hospital," we find statements which excite our sympathy for the patients, as well as for the pupils.

> Upon the surgeon entering the hospital ward, instead of all that order and quietude which ought to prevail, a scene takes place that almost baffles description; he is followed to the bedside by an immense number of pupils, perhaps forty or fifty, all of whom are eager to hear his remarks and witness the plan of treatment adopted. As many as can possibly squeeze themselves around the bed do so, some sit, some kneel and some stand on it, while those in the rear keep up a continual bustle in endeavouring to dislodge those who had procured better places than themselves.

The student who wrote this letter says that he paid twenty guineas for being allowed to "walk the hospital" and continues: "In the operating theatre, the students are actually far worse situated than in the wards, and I assure you, sir, I never had a fair and undisturbed view of an operation on the regular operating day since I have had the happiness of being attached to this establishment."

In another letter we find further demands on our sympathy but for a different reason. Here an aggrieved dresser complains that in consideration of an extra fee he was to be allowed to visit, examine and *prescribe* for a certain number of patients. The privilege was cancelled without warning and the dresser told "that no order or prescription will be attended to at the apothecaries' shop unless it comes from the house surgeon." He says, and to modern ears it sounds reasonable enough, that two house surgeons cannot possibly look after five hundred patients.

That at times a good deal was left to the dressers is shown by a case which Abernethy quoted in one of his lectures. It was that of a man who, having sustained a not very serious injury to the head, was brought into St. Bartholomew's Hospital and put under the charge of a dresser who was an enthusiastic advocate of venesection. The patient was bled three times a day for ten days when he died, and at the post-mortem no other cause for his death could be found than the loss of blood.

Something more than an ambition to prescribe drugs and to bleed seems to have inspired the hero of the following story which appeared in the report of one of Sir Astley Cooper's lectures and which throws a gleam of light on an age in some ways widely different from our own:

> A few years ago one of the dressers at St. Thomas's Hospital, wishing to perform an operation, turned his attention to the surgery boy, who had a deformed leg. He said to him one day:
>
> "Abraham, I should like to cut off your leg."
>
> "Indeed," said Abraham, "*I* should not like it."
>
> "Oh," said the dresser, "it will never be of any use to you in its present state. and therefore you would be better without it. I will take a lodging for you. I will give you some money and you shall be well attended to."
>
> The boy's objections were overcome. He took the money and went to the lodgings. All arrangements having been made, the operation began; but the dresser finding a great discharge of blood cried out to his assistant:
>
> "Screw the tourniquet tighter!"
>
> Unfortunately the screw broke and at this unforeseen accident the dresser lost his presence of mind. He jumped about the room, then ran to the sufferer and endeavoured to stop the effusion of blood by compressing the wound with his hand, but in vain. His sleeve became filled with blood. Poor Abraham would have died in a very short time had not another pupil, happening to come in, compressed the artery with the door key.

We may suppose that the student, never having performed an operation, wanted to find out at the least possible cost to himself whether or not he had the nerve to be a surgeon. As to the surgery boy, he must have known from actual observation, or at least on good authority, what an operation meant in pain and danger. He must have known that he could have had the operation done in the hospital at no expense to himself by one of the most experienced surgeons in the country and yet he deliberately chose to put himself in the hands of a tyro. It seems unlikely that it was nothing else than stupidity. Perhaps it was the temptation of a comfortable room to himself and the chance to be waited on during convalescence. It must be remembered that a hundred years ago the poor in London lived very close to starvation and under the most appalling conditions of over-crowding and lack of sanitation. Perhaps it was what he had seen of the treatment of the patients by the nurses that made him chary of submitting himself to their ministrations. He was well justified if we may judge by a case published in the *Lancet* in 1828. It was that of a boy aged twelve who was brought into St. Bartholomew's Hospital unconscious, having sustained a fracture of the base of the skull. When consciousness was returning he was given an enema and died in great agony ten hours after. At the post-mortem the enema was found in the peritoneal cavity and a tear in the rectum. The nurse in attendance on the boy when questioned said that "she had never experienced so much difficulty in giving an injection." The "pipe of the syringe" was sent for and found to be "of a most unwarrantable length, namely seven or eight inches, and by some means or other broken off from the syringe, whether in use or not we could not ascertain." "We are happy to say," ends the report, "that the sister has since been discharged for drunkenness and misconduct of another nature."

There was a complete separation between students of medicine and students of surgery, the latter only rarely entering the medical wards. In 1820 there were at St. Bartholomew's Hospital only three students of internal medicine, while there were hundreds of surgical students. The little that the latter knew of medicine was acquired by watching the medical treatment of surgical cases by surgeons.

That manners have considerably softened during the last century we have evidence in the description of a fight which occurred in St. Thomas' Hospital on December 16, 1836. It should be said that the Borough Hospitals, Guy's and St. Thomas', had an agreement by which the students of one had access to the other. On that date there were to have been three operations for stone in the bladder at St. Thomas'. Two dressers from Guy's standing on the floor of the amphitheater were ordered by a porter in "a loud and insulting tone of voice" to stand back, but refused to do so. Whereat the porter "sprang at one of the dressers, seized the collar of his coat, and began to drag him out of the theater." When some other students ventured to interfere:

> The porter drew forth a constable's staff . . . and showed symptoms of forcibly using his truncheon. Other porters and policemen interposed and a serious conflict commenced between these on one side and the students on the other, when many hard blows were exchanged, but the rescue party proved successful, when the police finding their troop over-powered, sent for a fresh supply. The fight was renewed and after some damage to the hospital property, ended in laughter. . . . Some person slightly resembling Sir Astley Cooper in appearance was in the act of passing through the public thoroughfare when he was mistaken by the students for the worthy baronet, and under the impression that Sir Astley, being accidentally at Guy's, had heard of the conflict and had come to the assistance of Guy's men, a general cheering was commenced, which so alarmed the passenger, who proved to be a venerable old gentleman . . . that he suddenly took to his heels and fled as fast as his legs would permit. The circumstance quite restored the good humour of the party.

Another of the many causes in which Wakley took up the cudgels was the unfair treatment of the junior members of the medical service in the navy. That there was urgent need of such championship may be gathered from a letter which was published on June 27, 1835, under the heading, "Conditions of assistant surgeons in the navy," in which the writer says:

> Mr. A. was appointed to an eighteen gun brig . . . after descending a ladder, was shown into the gun room . . . a filthy and obscure place, where there was a long deal table, half covered with a dirty brown table cloth; on benches along the side were ten or twelve slovenly boys, consuming voraciously beefsteak and onions, and rum and water. . . . At four o'clock, Mr. A. had with his new comrades, tea, or more properly speaking, hay water, and biscuit with butter in the submarine tenement, and at eight, rum and water, when the company was considerably increased by several ladies of more than doubtful character, conversation and behaviour. At ten, lights out, and by the aid of a lantern he found his

> way to the sick bay. . . . The only furniture was three medicine chests, and several sick people who coughed all night. . . . The dispensary was only large enough to admit one arm or a leg at a time, and the hammock and sleeping berth were exactly those of the commonest sailor . . . his hammock was hung almost immediately under the hatchway . . . so that rain, snow and hail could reach him, with a pool of dirty water to step into . . . without spot or space to wash. . . . To read in the berth was impossible; the noise, skylarking and nefarious tricks pursued against the unoffending books soon put a stop to that. Writing was still further out of the question. Years were to be spent without any enjoyment of either. His time must be spent in lolling on a locker below, or walking the lee side of the quarter deck, without one kindred soul to converse with. Added to all this, there was no private stock in the mess, nothing but King's provisions, and as from the natural consequence of cruising, the utensils gradually disappeared, for want of funds they could never be replaced, so that in process of time, plates, tumblers, cups, knives and forks, etc., came to be deemed altogether supernumerary articles of luxury. . . . By paying an exorbitant sum to the gunner, he procured the cabin of that person as a tenant, for "incredibile dictu," gunners, boatswains and carpenters have cabins, while assistant surgeons have not.

This description tallies closely with Smollett's account in "Roderick Random," published eighty-seven years before, and bears witness to the phenomenal power of resistance to reform which distinguished the lords of the admiralty during the eighteenth and early part of the nineteenth centuries.

On another occasion the *Lancet* published a letter from an assistant surgeon who complained that he was ordered by the first lieutenant of his ship to apply the stomach pump, by way of punishment, to two slightly intoxicated seamen and, having respectfully protested before doing so, he was summoned to the quarter deck where the captain of the ship told him that he had been reported for insolence and disobedience. On his presuming to defend himself against these charges he was told that he was a "litigious character"; that he would be reported to the physician-general of the navy, and that on the first opportunity the effect of a court-martial would be tried on him.

Now and then we get interesting glimpses of hospital administration. At the very beginning of his career as editor, Wakley, always on the lookout for abuses, drew attention to the hawking of porter in the wards of St. Thomas' Hospital, and of oranges, tarts and other delicacies in Guy's. A man who had been a patient at St. George's states that he had been in hospital suffering from a fracture and did not have his sheets changed for three weeks, but this was mentioned incidentally and without any suggestion of its constituting a grievance. He was fortunate in having a towel of his own, as none were supplied by the hospital, with the exception of a roller towel which did for the whole ward. Another patient stated that his bed linen was changed once a month.

The apothecary of the Westminster Hospital, we read, performed the duties of the general medical superintendent. In the absence of the physicians and surgeons he was responsible to the board for the proper treatment of cases. He was allowed a pupil or apprentice who paid eighty guineas, half of which went to the hospital. There was a regulation that the apothecary "shall once a day visit each ward and respectively enquire into the condition of each patient, whether the medicines ordered have been administered and with what effect, and report the same, if requisite, to the physician and surgeon. A Dr. Seymour, lecturing at St. George's Hospital, says "in this hospital the wards are so well ventilated that we are not afraid to place a patient afflicted with scarlatina amongst the other people in the ward, and seldom, if ever, find any results occurring from it." In 1824, patients with gonorrhea at Guy's Hospital, and probably at the other large hospitals in London, were kept in lock wards, and were given a six weeks' course of mercurial treatment by the mouth and by inunction. On May 15 of that year the *Lancet* pulished a lecture by Sir Astley Cooper in which he attacked this custom so fiercely that it was soon after discontinued. He said:

> As long as I continue a surgeon of Guy's Hospital, I will endeavour to do my duty, but I care not whether I continue a surgeon of that hospital another day, I *do* say that the present treatment of patients with gonorrhoea in these hospitals by putting them unnecessarily under a course of mercury for five or six weeks is disgraceful. . . . You are aware, gentlemen, that I scarcely ever enter the foul wards. . . . I abstain from entering them because patients under gonorrhoea are compelled to undergo so infamous a system of treatment that I cannot bear to witness it. . . . If you ask whether he is salivated he will tell you that he spits three pints a day.

It is hard for us to realize the extent to which the administration of mercury was carried. Liston in his "Elements of Surgery" referred to patients who spat "some gallons a day," and "whose tongues protruded from their mouths."

It is with something of a shock that one realizes that as recently as one hundred years ago there still lingered in the minds of the public, and even of medical men, a belief in the possibility of spontaneous combustion in human beings. In a footnote to a report of a lecture on animal heat we read the following:

> The inflammable woman of Coventry, as described by Mr. Wilmer, appears also to have reduced herself by dram drinking to such a state as to be capable of being set on fire and burning like any other combustible matter. . . . In like manner the Countess Cornelia Bandi near Cesena, in Romagna in 1731, in the 62nd year of her age, was found in the middle of her bed-chamber, reduced to ashes. These ashes were light and left in the hand a greasy and stinking moisture; the floor was smeared with a gross unpleasant moisture and the walls covered with a moist soot.

Perhaps this was the source from which Dickens obtained the particulars for his description of the untimely end of Mr. Krook in "Bleak House." Certainly the ghastliness of the subject lost nothing in the telling:

> "What in the devil's name is this? Look at my fingers." A thick yellow liquor defiles them which is offensive to the touch and more offensive to the smell—a stagnant sickening oil, with some natural repulsion in it that makes them both shudder. . . . "I couldn't make him hear, and I softly opened the door and looked in; the burning smell is there—the soot is there—and he is not there," Tony ends with a groan.

Alas for poor Mr. Krook, whose sleep, according to the young man of the name of Guppy, was "always more like a fit than a nap!" Another case of spontaneous combustion was that of a fisherman's wife at Ipswich who was "consumed with an inward fire. She appeared like a heap of charcoal covered with ashes. The legs, arms and thighs were very much consumed. However, it is remarkable that the deal floor on which she was extended had no appearance of being in the least singed." Under the heading "Foreign Department" we find the following: "In the 'Journal de Pharmacie' there is a case recorded by Professor Rudolphi, of a man who suddenly felt a pain in the arm, similar to that produced by a blow from a stick and immediately perceived a small flame, which burnt his shirt." There is also mentioned the case of a girl, seventeen years of age, in whom a kind of bluish flame appeared around the finger, the flame would not be extinguished by water, but could only be distinguished in the dark.

Among the miscellaneous items of interest which the writer came across in the *Lancet* was a report written by the Swedish consul-general at Tangier, on the subject of a Spanish army surgeon who was studying the plague by inoculating deserters with pus from pestilence buboes. These experiments were done, we are told, with the approval of the Spanish government. Of the approval of the deserters nothing is said; their interest in the results of the experiments may perhaps be taken for granted. None of them seems to have contracted the disease.

In lighter vein is an account of a discussion at a meeting of the London Medical Society on the subject of maternal impressions, where one of the members described a birth mark which closely resembled a mouse. It appeared that whenever a cat entered the room where the patient was, the part of the birth mark which corresponded to the mouse's tail, curled up.

In the *Lancet* of April 19, 1828, there was a letter to the editor, evidently from the pen of a disgruntled member of the humbler stratum of the profession, suggesting the appointment of a professor of humbug at London University. This idea, were it carried into effect at the present day as an essential part of medical education, might be the means of preventing many capable men failing as doctors. The student might be taught the relative merits of pomposity, obsequiousness and bonhomie, as foundations upon which to build a good bedside manner. Nothing could be more helpful than a training in the accurate estimating of social position and financial status, in means to keep in the public eye, and in using to the best advantage such mechanical aids to practice as bright lights, jets of water and static sparks. Nor would time be wasted in studying the art of deluding patients into the belief that the doctor's failures are due to Nature and Nature's successes to the doctor.

> And thus with feyned flaterie and japes
> He made the persoun and the people his apes.

The writer has not attempted in his selection from the pages of the *Lancet* to portray to any extent the war which Wakley waged, almost single-handed, against powerful vested interests. The victory was won long ago, and we of this generation accept its fruits as a matter of course, ignorant or careless of the debt of gratitude we owe to the greatest medical reformer England ever produced.

In conclusion I wish to express my thanks to the members of the staff of the Medical Library of McGill University, Miss Jean Cameron, and her assistants, Miss Clara Davidson and Miss Pauline Carrière, for the help I have received in collecting material for this paper.

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GALEN'S DISCOVERY AND PROMULGATION OF THE FUNCTION OF THE RECURRENT LARYNGEAL NERVE*

By JOSEPH WALSH, M.D.

PHILADELPHIA, PA.

WE have several portraits of Galen, none of absolute authenticity. On a manuscript edition of Dioscorides from about 500 A.D. is an alleged portrait as an old man, whether or not an actual representation we do not know, yet there is no impossibility that it may have come down on succeeding manuscripts.

On a medal struck during the reign of Commodus is a man representing Pergamum. Fabretti and Bonarotti assert that this and the portrait of the old man called Galen on the aforesaid manuscript are the same at different ages. The marble bust in the hall of the College of Physicians, of Philadelphia presented by Dr. Richard H. Harte in 1912, appears to have been made from this medal. It is the portrait to which I am personally most attached.

The first illustration shows five portraits: on the top row are the seated old man from the manuscript of Dioscorides, and the full figure on the Medal of Commodus. This medal shows two men holding statuettes, evidently representing Pergamum and Ephesus, since the two cities are designated below. The representative of Pergamum is a man about the age of fifty to sixty with the mantle of Aesculapius about him, the statuette of the god in his right hand and the baton in the left. He has a sort of turban on his head which was usually put on images of physicians to indicate their calling. The other figure, representing Ephesus, has not been identified. He holds in his right hand a statuette of Diana and in his left a spear of Artemis Agrotera (the huntress).

On the bottom row is a typical Roman of the first century, when clean-shaven faces were in vogue. Beards came in again with Hadrian, and following the custom of philosophers and physicians, it is likely Galen wore one. I have no reason to believe it is a portrait of the master.

My own impression would be a man of medium height, homely, intellectual looking, with a definite eastern cast of countenance, aquiline nose, prominent chin, not particularly prepossessing either in appearance or address. He was convincing in language on account of his broad knowledge and sincerity, yet so over-ready to argue and contradict as often to arouse an antagonism preventing conviction. Since he was, however, one of the most brilliantly educated and most industrious scientific workers, thinkers and writers who ever lived, with a quick temper which made him one of the most belligerent talkers, it is safe to put all this in his physiognomy. The fifth portrait would not be unfavorable to this description. I do not know its source, though it is sometimes seen parading over his name.

Previous to his time, it was the popular idea that the center of intelligence and thought was located in the chest, and the brain was only for the purpose of cooling the blood. The argument of Diogenes of Babylon still prevailed: that we speak with the larynx, and, the impulse to the movement of vocal cords being from the lungs, thought must be some place in the chest, probably in the heart. Galen's discovery, showing the connection of the brain with the vocal cords and their failure to act when the recurrent laryngeal nerve was divided, settled the question for all time.

In order to understand some of the side features accompanying his demonstration of this discovery to the Romans, and their skepticism, a short review of his career is necessary.

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* Read before the Section on Medical History of the College of Physicians of Philadelphia, March 24, 1925.

He was born in Pergamum, Asia Minor, 130 A.D., and given a very careful training in the classics, philosophy and medicine. His native city was one of a galaxy comprising Smyrna, Ephesus, Rhodes, Cos and Miletus, which represented the highest in art and education in the world. Their importance may be seen from the fact that Cicero, Caesar, Brutus and Cassius studied their oratory at Rhodes. And Galen justifiably assures us that the temple of Aesculapius at Pergamum, where he studied medicine, was the most illustrious to this god in the world, and was as well known as the temple of Diana at Ephesus, or of Apollo at Delphi (XIII, 271).[1] This is confirmed by a letter of Marcus Aurelius to Fronto, about 142, praying for every good fortune on his birthday, in which he informs him: "I climb first the citadel of the god of Pergamum and beseech Aesculapius to protect your health; I pass on to Athens and clasping Minerva by the knees, etc." According to Friedlander,[2] in Byzantine times it was considered one of the wonders of the world.

The city was situated half on a beautiful plain and half on the hill ascending to the acropolis, as the accompanying plan shows. In the city proper was the amphitheater, where Galen at the age of twenty-nine became medical director of the training school and surgeon to the gladiators. This amphitheater was about the size of a Philadelphia city block, being four hundred and fifty feet in diameter. A small tributary of the Selinus ran through it, which when dammed gave opportunity for nautical sports.

On the acropolis, six hundred feet above the plain, were situated most of the official buildings, among others a temple to Augustus, to Athene, and an altar to Jupiter. The last was one of the most famous in the ancient world; in fact, the recent excavation of this altar and the temples about it has given us new ideas relative to antique art, and the possession of these

FIVE PORTRAITS OF GALEN. A. FROM MANUSCRIPT OF DIOSCORIDES. B. FROM MEDAL TO COMMODUS. C. BUST IN THE COLLEGE OF PHYSICIANS, PHILADELPHIA.

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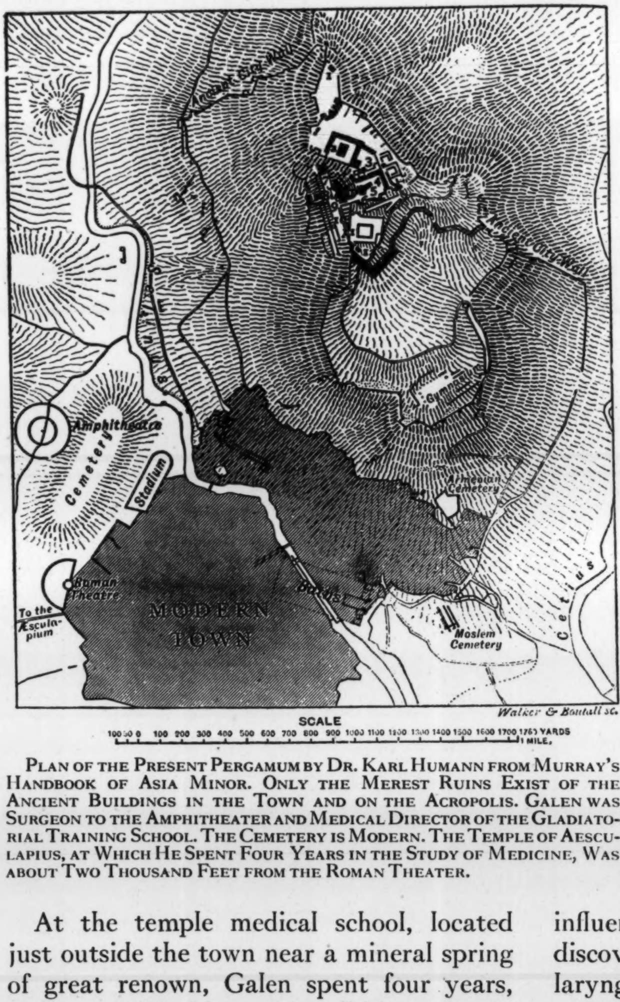
[1] The references in parentheses are to the volume and page of Kühn's edition of Galen.

[2] Friedlander. Roman Life and Manners under the Early Empire. Trans. by Magnus, Lond., II, 325.

sculptures has raised the Berlin Gallery to a rank near that of the Louvre. On the acropolis also were the schools, the market place, and a beautiful theater overlooking the plain. Mahaffy says of Pergamum: "We do not know of any Hellenistic city, except perhaps Rhodes, where life was more refined, morals better, or learning more respected." And Pliny calls it "the most celebrated town in Asia Minor."



Plan of the Present Pergamum by Dr. Karl Humann from Murray's Handbook of Asia Minor. Only the Merest Ruins Exist of the Ancient Buildings in the Town and on the Acropolis. Galen was Surgeon to the Amphitheater and Medical Director of the Gladiatorial Training School. The Cemetery is Modern. The Temple of Aesculapius, at Which He Spent Four Years in the Study of Medicine, Was about Two Thousand Feet from the Roman Theater.

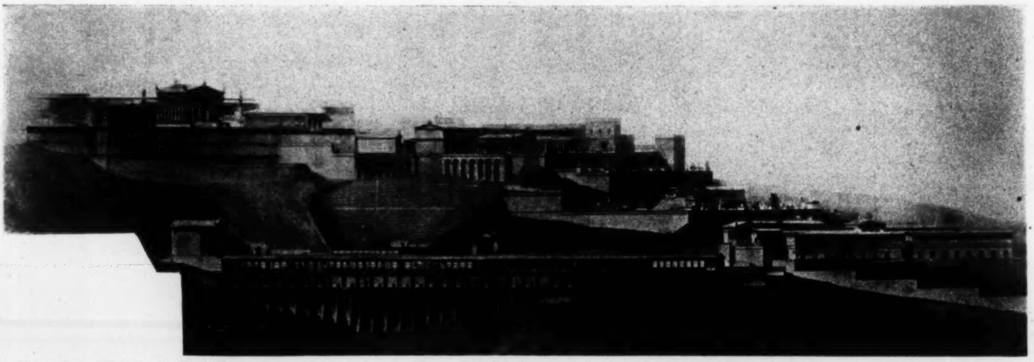
At the temple medical school, located just outside the town near a mineral spring of great renown, Galen spent four years, but not satisfied he continued his studies in Smyrna for two more, and then, with the wonders of the School of Alexandria in his mind, he betook himself to Egypt. Here he remained five years, broadening himself in mathematics, astronomy, philology, philosophy and medicine, and imbibing a love for anatomy and physiology which never left him.

On his return to his native city his medical knowledge was early recognized, and he was appointed to the highest position of the city, namely, surgeon to the gladiatorial amphitheater. Here he began the anatomical and physiological research on dead and living animals, for which he is entitled "The Father of Experimental Physiology."

The thoroughness of his dissections is evident when we learn that to an already well-described muscular anatomy he added the superior palpebral, buccinator, platysma myoides, the palmaris, plantaris and the interossei of the hands and feet, and he increased the scope in every other realm of anatomy as much. As a student in Smyrna he had become interested in the movement of the chest in respiration, and continuing this work, he unfolded for us the complete story as to the influence of the diaphragm and the intercostal muscles. It was he who discovered the decussation of the fibers of the intercostals and its significance. In this study he cut the phrenic nerve and watched the action of the intercostal muscles, then by a difficult operation on another animal cut the intercostal nerves at their exit from the spinal canal, and watched the action of the diaphragm alone. It was while dividing the different nerves in the vicinity of the lungs to learn their influence on respiration, that he accidentally discovered the function of the recurrent laryngeal.

The manner of discovery is evident. The pig was tied on the table without an anesthetic, and only kept intermittently from squealing by the hardy hands of a slave. The recurrent laryngeal was cut, and in a dramatic fashion the squealing stopped instantly. Further experimentation showed that section of it not only prevented the pig from squealing, the dog from barking, but all other animals from emitting their peculiar cry.

As stated, this discovery established for all time that the brain is the organ of thought, and represented one of the most important additions to anatomy and physiology, being probably as great as the discovery of the circulation of the blood. If he never did anything but this he would deserve a place beside Erasistratus, Herophilus, Vesalius, Harvey and Virchow.


Temple of Rome (called also Augusteum and Trajaneum)
Temple of Athene
Grand Altar of Jupiter
Library
Theater
Market Place
Temple of Dionysus in Market Place
Grand Terrace
Small Temple of Caracalla

Acropolis of Pergamum Restored. One Section of the Market Place (the Director's Conference Room) Was Probably Built by Galen's Father, Who was an Architect. (From "Pergame," Paris, 1900.)

In his physiological experiments he mentions (xiv, 627) most frequently pigs, goats and sheep, both because they were handiest and because he recognized the physiological similarity of the pig to man; in his anatomical researches he employed apes, for he says to his students (xiii, 604): "After examining carefully the position and size of nerves and tendons in apes, you will recognize them easily in the human body, but without this, your surgical work is vain." He also tells us that he dissected horses, asses, mules, cows (ii, 352), lynxes, stags (iii, 844), bears, weasels, mice, serpents, many kinds of fish and birds (ii, 548), and at least once in Rome an elephant (ii, 619). He says he never dissected ants, gnats or fleas (ii, 237). Unlike some others he never dissected human bodies, either of enemies killed in war (ii, 385) or of dead exposed children (ii, 386).

With the difficulty of housing in a city dwelling the large animals employed, it is interesting to speculate on where he did this wonderful series of physiological experiments. Three possibilities occur to us: the stable of his own farmhouse on the road to the seaport Elaea, an apartment associated with the quarters for animals destined for sacrifice within the precincts of the temple of Aesculapius, or for the animals destined for the arena connected with the amphitheater. After consideration, I believe he worked in all three, assisted by his slaves on the farm and by students and priests or gladiators in the other two places, to whom he took pleasure in demonstrating his new findings or anatomical facts previously unknown to them.

Though Galen's father was an architect by profession and one of the most intellectual and opulent citizens of Pergamum, he owned a farm in the country, which he apparently worked as a gentleman farmer, and in addition to deriving the ordinary products of agriculture, carried out on it a number of experiments in connection with the growth of plants and the aging of wine (xiv, 17). It is evident, therefore, that our physiologist inherited his investigative turn of mind and in his early student days it is not unlikely that when animals were butchered on the farm the father took pleasure in studying with him the comparative anatomy.

Galen tells us his mother was mean, nagging and quick tempered, and there is question that this farm was the father's occasional refuge from the wife, whom the son is forced to compare with Xantippe. He describes the farm house, and I have introduced a drawing made from his description, for it is probable that this retreat, purchased to afford escape from an impossible woman, represents the Mother of Physiological Laboratories.

Galen in the Amphitheater of Pergamum Treating a Gladiator Wounded in the Act of Playing the Part of the Retiarius as Indicated by the Net and Trident. Illustration from about 1870 by Jan Verhas (1834–1896), the Well-known Belgian Genre-painter, Whose Most Popular Work, the "School Feast" is in the Brussels Gallery. There are Several Things about It Not Consistent with Facts] Which We Know: First, Being 450 Feet in Diameter the Amphitheater was Sufficiently Large to Allow Space for a Special Treatment Room Apart from the Dens of the Wild Animals; Second, I Am Quite Sure the Gladiator would at Once be Put on an Operating Table; Third, with Galen's Insistence on Cleanliness He Would Not Be Wearing the Toga. (From Figuier's "Vies des Savants," Paris, 1870.)

The Parthian War breaking out and interfering with his research in Asia Minor, he hastily packed up and went to Rome, at the age of thirty-three. Galen's eleven years' study of medicine had made of him a modern regular. There were at the time a number of medical sects, the four principal being the Dogmatist, Empiric, Pneumatist and Methodist. The last had been founded in Rome two hundred years before by Asclepiades, friend and physician to Cicero, and enrolled under its banner were most of the Roman physicians. Methodism was an off-shoot of the Epicurean-Lucretian philosophy in vogue at the time of Caesar. It denied an over-ruling Providence and contended that all things existed by chance. It asserted that the body was a fortuitous coming-together of atoms, and that there was little, in fact almost no, relationship between its different parts. As a consequence, the study of anatomy and physiology was futile. Between the atoms making up the body were invisible pores, and disease depended on whether these pores were too tight or too loose. All diseases being classified under these two heads, it was possible to learn the whole art of medicine in six months.

Galen was one of the most pious of pagans, surpassing in this regard everyone, except possibly Marcus Aurelius; in fact, the pair of them represent the best-known pagan saints. To deny Providence, therefore, was bad enough, but to add that his beloved science, at which he had spent eleven years, could be learned in six months so enraged him that from the time he met his first Methodist in Alexandria till he died, forty-seven years later, he never stopped railing against them. Unnecessary to say he made himself immediately unpopular in Rome, where their number was greatest.

During his first six or seven months in the capital, while gaining the enmity of the physicians, he became acquainted with a number of philosophers, especially Platonists and Peripatetics, who were interested in his anatomical and physiological investigations, and when the physicians disdained, they took him up.

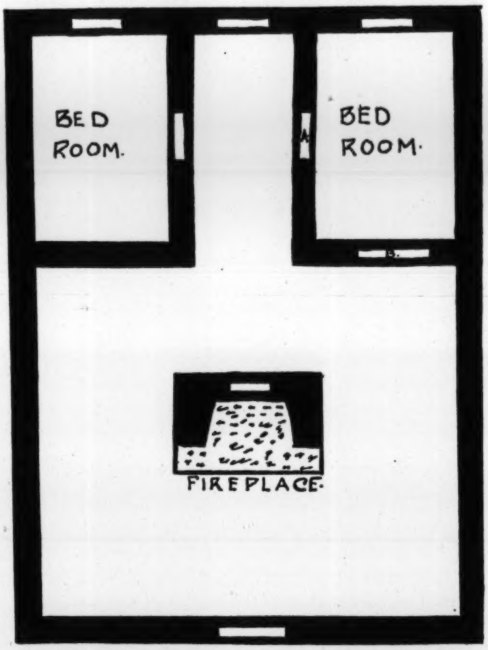
One of these philosophers was Eudemus, whom Galen cured of quartan fever.

Through him he met Boethus, a Peripatetic, who had shortly before been consul, and who became Galen's greatest stimulator. Insisting on the Pergamite demonstrating this wonderful discovery, Boethus said he would supply the animals necessary and had at hand both goats and swine, and if monkeys were required he would procure them also. Consenting, our physiologist stated that since all larger animals show a similar larynx and utter not dissimilar sounds, monkeys would be superfluous; the demonstration was, therefore, on a pig.

Many of his subsequent lectures were in the Temple of Peace, but it would seem this first was in a hall hired for the purpose by the consular. Quite a number of philosophers, especially Peripatetics and Platonists, came on the invitation of Boethus, who had personally advertised it widely, among others, his own assistant Adrian, Demetrius Alexandreus and the eminent Alexander Damascenus. Galen took particular pride in having the last as auditor, and when he mentions (ii, 218; xiv, 628) this address insists on his presence.

Galen's medical rivals had discussed the subject freely with the philosophers and stated their opinion in regard to some of the new ideas he was to present (xiv, 626). One of these philosophers was Alexander Damascenus, and they apparently persuaded him the Pergamite was describing things in anatomy which did not exist, or at least drawing conclusions from them in relation to physiology which were not justified. Alexander, therefore, as well as other philosophers, accepted the invitation not only in a skeptical frame of mind, but determined to prove Galen wrong. A certain number of physicians even went to heckle him, because in the meantime he was practicing actively, talking freely, and expressing on every occasion his low opinion of them.

On the case of Eudemus he had offended Martianus, author of a work on anatomy which was standard for more than thirty years, and Antigenes, apparently one of the best-educated Dogmatists in the capital. Between this case and his demonstration he was called to visit the well-known rhetorician, Diomedes, on the Sandalarium. This was the street of bookstores and publishers,

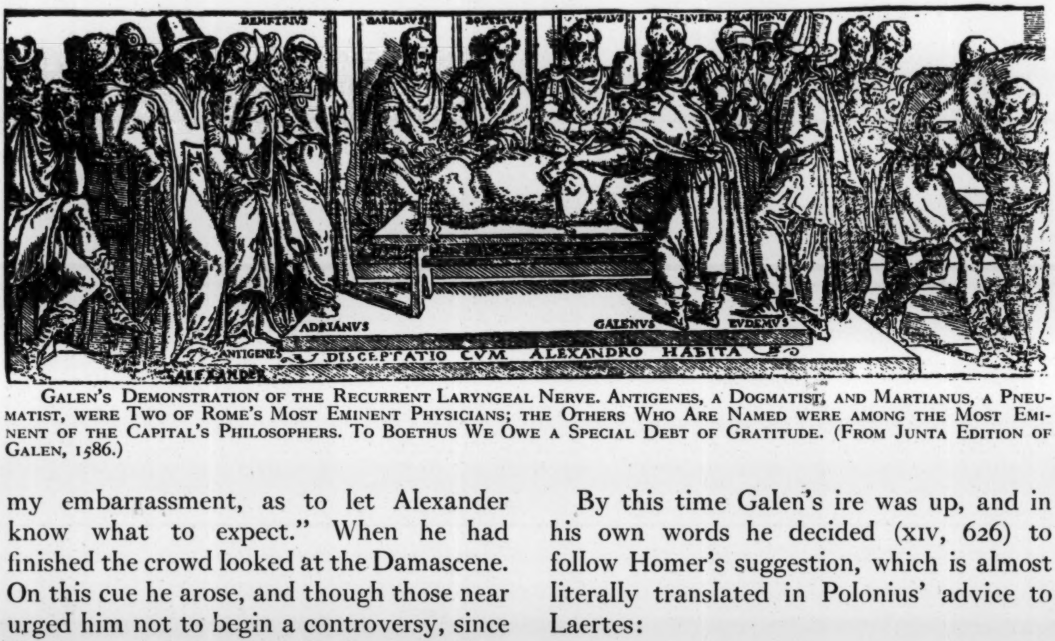


Dwelling House on Farm Outside of Pergamum Owned and Operated by Galen's Father, for Purposes of Agriculture and Carrying on Experiments with Almonds, Peas, Beans and Lentils, and Experiments in Connection with the Rapid Aging of Wine. The House (Drawn by Mr. A. Britt) is Described (xiv, 17) by the Son in Order to Show Where the Wine Was Stored. It Was a One-story, Large Living-room with a Fireplace in the Center; Attached to the Back was a Lean-to Extension with Two Bedrooms. Around the Walls of the Living-room Were Cabinets and Receptacles for Household Necessities. *A* Represents the Door of a Bedroom, *B*, The Opening into an Attic Space (the Storage Place of the Wine) above the Bedroom, so That the Wine Would Be Kept Warm by the Heat from the Fireplace in the Living-room. A Stable is Mentioned in General Terms as Not Far Distant from the House, and, from His Writings, Apparently Housed One or Several Horses, Donkeys, and Possibly Mules, a Number of Goats, Sheep, Pigs and Cows (v, 41), and the Farm Wagons and Implements. Here in the Shade of the House or the Nearby Trees, Enjoying the Thyme-scented Breeze (xiv, 22), Far from the Disturbing Voice of His Nagging Wife, Sat the Sire Meditating on a New Agricultural Plan, on Agricultural Experiments He Delighted in, or Daydreaming on the Prowess of the Brilliant Son, of Whom He Was So Proud. It was on this Farm the Child Galen, Watched Over by Slaves, Climbed the Hayricks; in Front of This Fireplace He Played, as He Details (ii, 17) with the Inflated Pigs' Bladders, Exhorting Them, as He Pushed Them toward the Grate, to Grow Bigger and Bigger, Which They Did on Account of the Heat; on This Farm the Stripling Rode and Planted and Mowed, and in This Mother of Physiological Laboratories the Medical Student and Physician Performed at Least Some of the Vivisection Investigations on Pigs and Goats, Which Give Him His Title of Father of Experimental Physiology.

and a common meeting-place of physicians. The most eminent of the court medical men were in attendance, and had diagnosed a simple ailment, which would be well in several days. Galen, apparently with his usual ostentation, diagnosed a chronic condition, which would be of long duration (xiv, 625), and though it proved true, he had added other enemies.

Before beginning, our lecturer gave a little explanation of what he was about to demonstrate, namely, the larynx, its muscles and the attached nerves, which being cut, the animal is rendered mute, though neither life nor action is interfered with. "I did this," says Galen, "not so much to relieve my embarrassment, as to let Alexander know what to expect." When he had finished the crowd looked at the Damascene. On this cue he arose, and though those near urged him not to begin a controversy, since they were anxious to see the demonstration, he taking advantage of the regard which all had for him, since most of them (among others Boethus) had been his pupils, made quite a little speech, and wound up with the statement: "Even if we are shown that section of these nerves in animals renders them mute, it is not necessary to believe it true of human beings." On hearing this Galen rose and, putting aside the dissecting instruments, said he had erred, and he would not have come if he thought he was to talk to such unteachable skeptics, and without more ado he departed.

Immediately the audience, turning on Alexander, upbraided him for his interference, and even Adrian and Demetrius, who were ordinarily conciliatory in speech, used violent language. Likewise, when others in the capital interested in scientific investigation, especially the noble and illustrious Severus, Paulus and Barbarus,[3] heard of it, they were loud in their denunciation, and requested the young physiologist to appear again in the absence of the dissenters, since even without them the audience would represent the most eminent in medicine and philosophy in Rome.



Galen's Demonstration of the Recurrent Laryngeal Nerve. Antigenes, a Dogmatist, and Martianus, a Pneumatist, were Two of Rome's Most Eminent Physicians; the Others Who Are Named were among the Most Eminent of the Capital's Philosophers. To Boethus We Owe a Special Debt of Gratitude. (From Junta Edition of Galen, 1586.)

By this time Galen's ire was up, and in his own words he decided (xiv, 626) to follow Homer's suggestion, which is almost literally translated in Polonius' advice to Laertes:

> Beware
> Of entrance to a quarrel; but, being in,
> Bear it that the opposer may beware of thee.

This time the demonstration was entirely successful, and the audience was so interested it returned several days, while he showed on the living animal the action of the intercostal muscles and diaphragm and the influence of each on respiration. He pointed out, as a discovery of his own, the obliquity of the former and the decussation of the internal and external fibers. He cut in succession the intercostal and phrenic nerves to show their particular action (II, 660, 677).

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[3] The son of the first married the daughter of Marcus Aurelius, the second was the prefect (practically mayor) of the city, the third was the uncle of the co-emperor Lucius Verus.

He further demonstrated the larynx, the vocal cords, the cartilages and muscles connected with them, and finally, the innervation, and followed the nerves around the arch of the aorta and subclavian artery to their junction with the pneumogastric (IV, 278). Severing them on a squealing living animal, he dramatically proved the loss of the voice.

All present were convinced and Boethus was so fascinated he requested a complete account and insisted on sending his stenographer so that Galen might have as little trouble as possible, for though the Pergamite almost surely had a slave secretary, it is possible he did not write shorthand. On completion of the dictation the consul, at his own expense, had the books published and distributed broadcast.

The author's little account of this demonstration, dictated for Boethus, as well as his book on the voice, composed later, has been lost, but he goes into the subject so in detail in his work on the "Use of the Parts," and this is written so like a lecture, that I have no doubt we have here not only what he said, but the manner in which he said it. His description (III, 409; IV, 465) of the muscles participating in the movement of the chest in respiration is too long to detail, hence we will limit ourselves to an abridgement of his demonstration of the larynx, which probably took up one of the several days the audience came to hear him.

It must be remembered that neither he nor his contemporaries had any idea of the contractility of muscle fiber. When it was discovered I have been unable to learn, but fourteen centuries later we know that Vesalius practically understood it. It was only about 1740, however, that Haller began to differentiate in any accurate manner between sensibility, irritability, elasticity and contractility. Galen thought nerve fibers divided up in the body of the muscle for some unknown reason, and came together again in the tendon, and it was the tendon, or rather the nerve in the tendon, which contracted, and the apparent contraction of the body of the muscle was only the slack thus produced.

Believing, therefore, a certain amount of actual pulling power was exercised by the nerve, it was necessary that it enter the muscle in the direction of pull. On account of the position of the vocal cord muscles, the nerve must come from below, and he goes into a long explanation as to the ingenuity of the Creator in accomplishing this. He says:

GLOSSOCOME OF GALEN. (FROM "OEUVRES D'ORIBASE," PARIS, 1862, VOL. IV.)

> If the heart was the origin of the nerves, as certain people thought who knew nothing of anatomy [he is particularly hitting Aristotle] it would be able to move the muscles of the vocal cords by sending the nerves direct from the heart to them, though a parallel difficulty would arise in connection with the muscles in the neck, which have their heads above.
>
> With the brain the origin of the nerves it is necessary to understand the action of a pulley as employed by builders or by the orthopedists in the glossocome. Surprising as it may seom, the pulley was made use of by Nature previous to its employment in the arts, in order to communicate the proper action to the muscles of the larynx.

He describes the descent of the pneumogastric nerve, the branches it gives off, and eventually the recurrent laryngeal. On account of the fact that if this nerve were sent directly to the laryngeal muscles it would act improperly, the Creator was obliged to make it descend into the thorax until it met a transverse post which could act as a pulley. The only object it met high in the thorax was the clavicle, but to use this would allow the nerves to come so close to the skin as to be exposed to every kind of injury. As a consequence He was obliged to conduct the two nerves onward until on the left the aorta was reached and on the right the subclavian artery. These, being sufficiently transverse and sufficiently solid, were employed.

On account of the fact that some of you may not understand the mechanism of the pulley, I will draw an illustration from a more common object, namely, the spina in the Circus Maximus. As the runners in the double course wind around the spina so the recurrent laryngeal winds around the aorta and the subclavian artery.

I want you to realize that what I am describing was discovered by me, that no anatomist knew a single one of these particulars, and hence made many errors in connection with the larynx.

Give me, therefore, more attention than if, admitted to the Mysteries of Eleusis, or Samothrace, or present at some other Holy Ceremony, you were completely absorbed by the action, and the words of the Priest. The action of the nerves resembles both the mechanism of the pulley and the runners in the stadium. I am not able to praise sufficiently the wisdom and power of the One who has created animals. Works so wonderful are above, I will not say praise, but even hymns; before seeing them we would not believe them possible.

FRAGMENTS OF CHINESE MEDICAL HISTORY*

By K. K. CHEN AND AMY S. H. LING

PEKING, CHINA

I. Hua Tu, The Chinese Surgeon

NEITHER before nor since the time of Hua Tu has China produced a surgeon with equal attainments. His accurate diagnosis, skilful operations and simplicity of treatment made him the champion of his time. Had his methods been preserved, the Chinese should have been able to practice their own surgery without borrowing many of the occidental discoveries.

Hua Tu lived at the end of the Han dynasty. Although he did not die a natural death, he lived about one hundred years (*circa* 115–205 A.D.).[1] Of his childhood we know very little. As he grew older, he was fond of travel, chatting and reading. Although he was well acquainted with the classics and versed in the best methods of living, he was very humble and eager to learn, as shown by the following incident: One day he was resting in front of a mountain cave when he heard two men discussing methods of cure. While Hua Tu was listening, one of them, catching sight of him, said: "Here is Hua, we can give him our secret." But the other replied: "That boy is greedy and merciless, how can we give it to him?" Being surprised, Hua Tu jumped into the cave, saluted the venerable hermits, and said: "I have just heard you discuss methods of cure and I could not resist staying here. I always like to save lives, only I feel sorry that I have not acquired any satisfactory way of practice. If you can enlighten me, I shall be very grateful to you for life." The senior of the two old men responded: "We are not stingy about the secret, only it may give you trouble. If you do not, however, distinguish the superior and the inferior, the rich and the poor, and the noble and the common, refuse bribery, and be not afraid of hardship and be kind to the old as well as to the young, you will get out of the trouble eventually." After accepting the "Hippocratic" oath, he was given a book and told not to show it to others. From this he derived several methods most useful in his future practice. Hua Tu spent his last few years with his wife, and though approaching five score, appeared to be youthful and strong.

As a practitioner, he used but few prescriptions and could measure the doses without weighing. Apparently he collected his own drugs for his patients, as drugstores were not yet in existence. In acupuncture he selected only a few sites. In other words, simplicity was his principle. In cases where neither acupuncture nor medicine could help, operation was resorted to. Before incision, he would give together with wine an anesthetic mixture called "Ma Fu Shuan." In Chinese language, "Ma" means hemp or narcotic, "Fu" aromatic, and "Shuan" powder. The constituents are not known today. It is indeed unfortunate to have two different meanings for "Ma," and the use of hemp (*Cannabis indica*) at that time cannot be definitely established. According to a literary mode of interpretation, it seems more natural to have the mixture translated as "narcotic aromatic powder." This anesthetic mixture is obviously the same as that referred to by M. Julien at the Academy of Medicine. Many authors of textbooks[2] accepted it unconditionally as a preparation of Indian hemp.

When the patient became drunk and unconscious, Hua Tu often did laparotomy, and removed diseased tissues. If the disease were of gastrointestinal origin, he would resect the viscera and wash the inside. It is probable that he even did end-to-end anastomosis of the intestines. After suturing and application of a plaster, the wound usually healed in five days and the patient completely recovered in a month. We are not told what suturing materials he used, or of the details of his surgical procedures that made his wounds heal so rapidly. A case of intense abdominal pain and falling out of whiskers and eyebrows for more than ten days, he diagnosed as necrosis of the spleen. After anesthesia was induced, operation confirmed his diagnosis, and he performed a partial splenectomy. With the assistance of drugs besides, the patient recovered in one hundred days.

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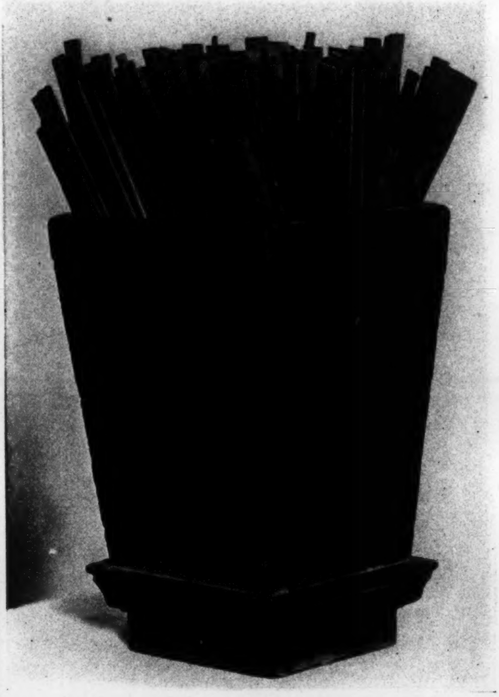
* Read at the meeting of the Wisconsin Medical History Seminar on December 16, 1925.

An Effigy of Hua Tu.

By the palpation of pulse (radial) Hua Tu is said to have been able to diagnose many conditions. One day, he was called to see the wife of a General Li. By palpation of her pulse, he diagnosed the presence of pregnancy. General Li informed him that the woman was delivered; but Hua replied that there was one more child yet. About one hundred days later, she had labor pains and Hua was again called in for consultation. Then he told the family that the fetus was dead. After acupuncture and medicine he ordered a person to perform manual removal of the dead fetus. It had the shape of a child but was entirely black. It would be interesting to find out if it were a case of twins with a retained second baby, or a case of superfetation. Another time he was called to see a woman of six months' pregnancy in abdominal pain, and he diagnosed again a dead fetus by the palpation of her pulse. He ordered a person to do a vaginal examination for confirmation and produced therapeutical abortion by drugs. It is interesting to note here that surgeons at that time, as is also true in most parts of the country today, did not handle delivery. Obstetrics as a rule is in the hands of midwives. By the examination of the pulse, Hua Tu was also able to diagnose the presence of worms in a patient who presented himself with epigastric fulness, cyanosis and loss of appetite after eating raw meat. He gave the patient a liquid preparation and made him discharge from the mouth a number of worms with red heads.

Hua's precision in giving prognoses was remarkable. He could predict the recurrence of a disease or death of a patient with the accuracy of days. Aside from acupuncture and drugs, he employed continuous hot fomentation for the bite of a poisonous insect, and cold baths as an antipyretic. A General Kwan was shot by an arrow in a battle and infection involved the bone (osteomyelitis). Hua succeeded in removing the infected osseous tissue by asking the patient to focus his sole attention in playing chess with another person. Although this was not in any way like mesmerism, yet he was able to utilize the patient's concentration of attention at a particular game during his operation so that the patient could stand more pain than otherwise.

In his later life, Hua Tu became the court physician of Chao Tsao, King of Wei (one of the Three Kingdoms). The latter was suffering from headaches and dizziness which were always temporarily relieved after an acupuncture made by this surgeon. Hua, however, was tired of court life and left for home on the pretext of his wife's illness. This false excuse was discovered by the king. Hua was summoned and killed. Before he died, he offered a valuable book to the jailer, saying: "This book can save Man's life." Being afraid of punishment for receiving gifts from a criminal, the jailer refused to accept it. Hua did not insist and burned it. Thus ended the life as well as the work of the great surgeon.



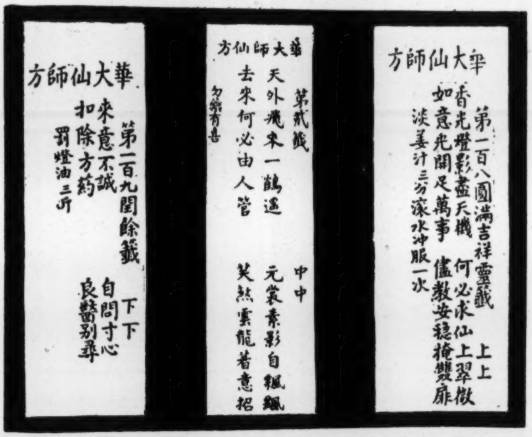
A BOX CONTAINING 109 LOTS.

Hua Tu had two pupils, named Wu Pu and Fan Ou. The former was more interested in internal medicine, while the latter preferred acupuncture. The teacher once said to Wu: "Exercise if not excessive helps digestion, improves circulation and prevents diseases." Obviously prophylaxis was advocated by Hua. Following the advice of the surgeon both of his pupils lived more than ninety years themselves.

Many years later, people thought so much of Hua Tu that a superstitious reverence grew up, so that even at the present day, temples, in which effigies are placed, are erected and dedicated to him in different towns. One of the effigies is represented here. When people became sick they would go to seek medical aid from him. The second illustration shows a box containing some one hundred and nine bamboo sticks on which are labeled numbers and combinations of "superior," "medium" and "inferior" qualities, indicating the gravity of the disease. The third illustration contains three prescriptions corresponding to three numbers on three different sticks. They are translated as follows:

1. No. 108. Superior-superior

The nearby fragrance of incense,
The gleaming of lanterns nearby,
Are all part of God's good will.
Then why should you go afar
Up the mountains to fairy lands?



華大仙師方
第一百八圓滿吉祥靈籤　上上
香光燈影盡天機　何必求仙上翠微
如意光開足萬事　儘教安穩掩雙扉
淡姜汁三分滚水沖服一次

華大仙師方
第貳籤　中中
天外飛來一鶴遥　元裳素影自飄飄
去來何必由人管　笑煞雲龍着意招
勿藥有喜

華大仙師方
第一百九閏餘籤　下下
來意不誠　自問寸心
扣除方药　良醫別尋
罰燈油三斤

THREE PRESCRIPTIONS CORRESPONDING TO THREE LOTS.

As soon as you begin to feel in harmony,
All will be well for you.
So close your doors and be at peace.

Dilute ginger juice, 3 fen
Sig. take in boiling water.

2. No. 2. Medium-medium

A crane is flying in the sky
With its quivering suit of gray,
Coming and going uncontrolled by any being
whatsoever—
And not even the signs of the Dragons in the clouds
Could effect its course in the least.

No medicine necessary*

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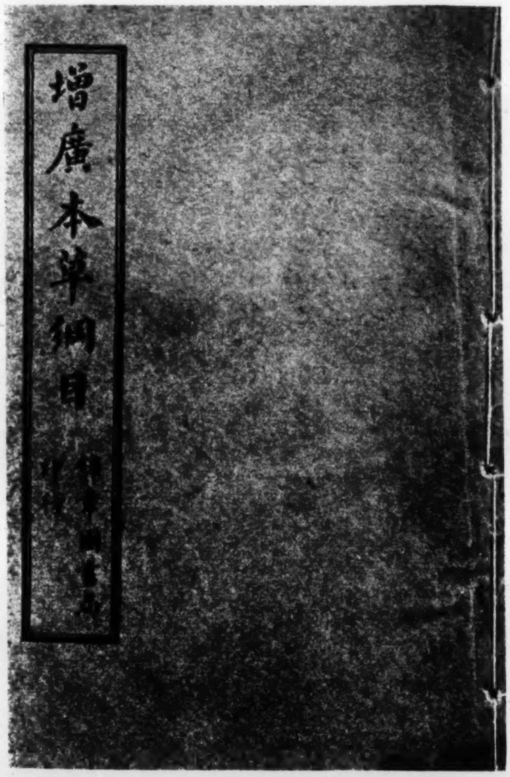
* *I.e.* You are free—do not worry.

3. No. 109. Inferior-inferior

Your coming hither is not sincere—
Ask your own conscience if this be not so.
So you are not to be granted any medicine—
Seek a good physician elsewhere.

Fined three catties of illuminating oil †

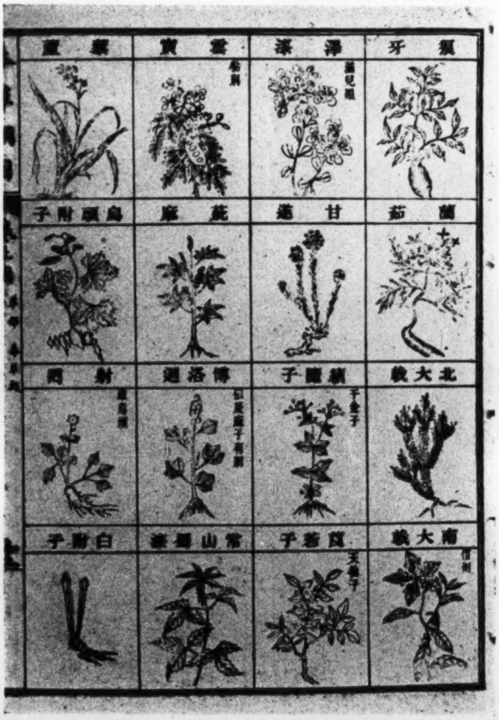
Each prescription, it should be noted, consists of a number, a combination of qualities, a superscription describing the condition in a poetic form, and an inscription prescribing one or more drugs, or giving some other advice. If a person has faith in him (Hua Tu) and becomes ill, he would send his relative or friend to visit the temple, draw a lot from the box and obtain a corresponding prescription. After he becomes well, offerings are often made, such as a new curtain or a robe.



THE FRONT PAGE OF PEN TSAO KANG MU AS REPRINTED BY ONE OF THE BOOK COMPANIES AT SHANGHAI, CHINA.

II. PEN TSAO

"Pen Tsao," the Chinese dispensatory, has a history almost as long as that of the Chinese race. The first edition was believed to have been written by Emperor Shen Nung some 5000 years ago. The latter lived between 3217–3077 B.C., and was a ruler of great ability. As the father of agriculture, he initiated methods of cultivation and taught people how to raise cattle, so that they would have a constant supply of food all year round. As the father of medicine, he tasted a hundred herbs and selected 365 plants for his book. One hundred and twenty were classified as "superior," 120 as "medium," and 125 as "inferior," the total number corresponding to the number of days in a year. The superior class was supposed to be non-poisonous and possess rejuvenating properties, the medium class to have some toxicity according to dosage



ILLUSTRATIONS OF DRUGS IN PEN TSAO KANG MU.

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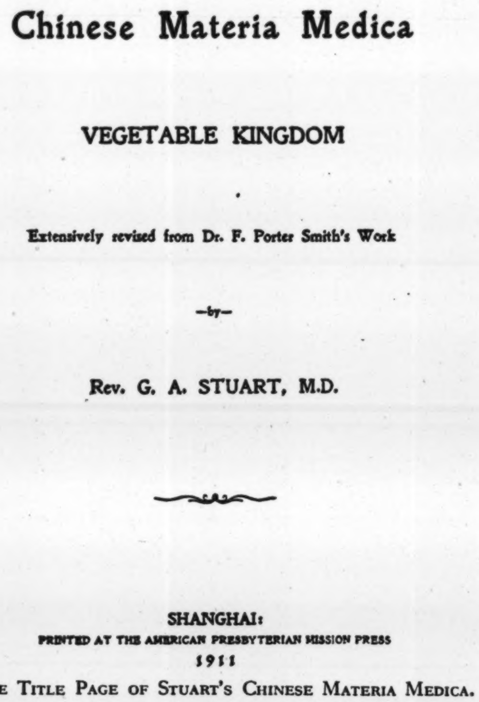
† In the temples of Hua Tu, a lamp is often lit throughout the day and night supposedly for the viability of his image. The illuminating oil is of vegetable origin, such as cotton seed oil, bean oil and other similar fatty oils.

and to exert tonic effects, and the inferior class was considered poisonous and able to reduce fever and cure indigestion. Early history informs us that Shen Nung met with seventy poisons in a single day, but later historians asserted he could not have tried more than twelve poisons. Then he applied the drugs to the sick people, employing emetics for epigastric discomfort and cathartics for tympanites and constipation. While his discovery of medicinal properties of plants was almost certain, his writing of Pen Tsao was much doubted, especially because the style of the literature and the references contained in it do not seem to belong to that period. Many authors suggest that the book was published in Han dynasty (25–219 A.D.).

In Liang dynasty (502–556 A.D.), Tou Hoon Chien revised the original edition, doubled the number of drugs and published the book in eight chapters. In Tang dynasty (618–905 A.D.), the revision was undertaken by the royal court. Thus Emperor Kao Chun (650–683 A.D.) appointed a committee of twenty-two officials to revise it, resulting in the addition of 114 drugs and redivision into fifty-three chapters. Similarly, in Sung dynasty (960–1276 A.D.), Emperor Tai Chiu appointed in year 973 a revision committee of nine, who inserted 120 more drugs. Additions were further made, and, by the end of that dynasty, the total number of drugs amounted to 1558.

The last edition, which is still in print as published by different book companies in China, is called "Pen Tsao Kang Mu," and was not undertaken by the court, but by a scholar, named Li Shin Cheng, in Ming dynasty. With a wide knowledge of medical literature, he felt dissatisfied with the Pen Tsao of his time, especially because of the confusion of nomenclature. A single drug might be described in several chapters, while two or three entirely unrelated drugs might be placed under one heading. Thus he exhausted the medical references, read over eight hundred textbooks, introduced 374 new drugs, altered his manuscript three times, and completed the book in thirty years. Unfortunately he died before he had a chance to submit his magnificient book to the emperor for approval. His son, however, offered it to the ruler on his father's behalf in the year 1596 A.D. The latter ratified its publication and distribution in the whole country. Supplements have since been made, but do not seem to contain essential additions. The front page of "Pen Tsao Kang Mu" as issued by one of the book companies at Shanghai is reproduced here.



Chinese Materia Medica

VEGETABLE KINGDOM

Extensively revised from Dr. F. Porter Smith's Work

—by—

Rev. G. A. STUART, M.D.

SHANGHAI:
PRINTED AT THE AMERICAN PRESBYTERIAN MISSION PRESS
1911

THE TITLE PAGE OF STUART'S CHINESE MATERIA MEDICA.

The number of volumes varies according to the publisher, but the book contains 1871 drugs under sixty-two orders and sixteen classes, in fifty-two chapters. The table of contents is followed by the illustrations of each drug. The first two chapters are devoted to references, synopsis of medicine, and essentials of therapeutics. Synergism and antagonism are discussed. The third and fourth chapters consist of a classification of drugs according to their clinical uses, while the remaining chapters deal with the drugs proper. Table 1 is a summary of the contents of those chapters.

TABLE I. SUMMARY OF CHINESE DRUGS IN PEN TSAO KANG MU

Class Name	Order Number	Number of Drugs	Chapter Number
Waters	1	13	5
	2	30	5
Flames	1	11	6
Soils	1	61	7
Metals and Minerals	1	28	8
	2	14	8
	3	32	9
	4	39	10
	5	47	11
Grasses	1	31	12
	2	40	13
	3	56	14
	4	53	15
	5	73	16
	6	47	17
	7	92	18
	8	23	19
	9	19	20
	10	16	21
	11	162	21
Grains	1	12	22
	2	18	23
	3	14	24
	4	29	25
Vegetables	1	32	26
	2	41	27
	3	11	28
	4	6	28
	5	15	28
Fruits	1	11	29
	2	34	30
	3	31	31
	4	13	32
	5	9	33
	6	6	33
Woods	1	35	34
	2	52	35
	3	51	36
	4	12	37
	5	4	37
	6	26	37
Utensils and Wearing	1	25	38
	2	54	38
Insects	1	23	39
	2	22	40
	3	32	41
	4	30	42
Fishes	1	9	43
	2	17	43
	3	31	44
	4	37	44
Mollusks	1	17	45
	2	29	46
Birds	1	23	47
	2	23	48
	3	17	49
	4	12	49
Beasts	1	28	50
	2	38	51
	3	12	51
	4	8	51
Men	1	35	52

The total number of drugs derived from plants amounts to 1074, that from animals 443, and that from minerals and other miscellaneous substances 354. Each drug is treated in the following order: (a) nomenclature, (b) definition, (c) collected information, (d) discussion of doubtful points, (e) corrections, (f) character of the drug, (g) therapeutic uses, and (h) formulae into which the drug is incorporated.

With the introduction of Western medicine into China, attention has been directed to the cure with native drugs. Inquiry has been made by F. Porter Smith, who published a Chinese Materia Medica apparently in the latter half of the nineteenth century largely based on "Pen Tsao Kang Mu." The edition was small and soon exhausted.

A revision was prepared by G. A. Stuart[3] who intended to publish a set of books on the vegetable, animal and mineral kingdoms. Unfortunately he died before his task was finished. His first volume on the vegetable kingdom was printed, however, shortly after his death. A reproduction of its title page is given here. The book is in the English language and consists of a long list of Chinese drugs with their botanical identifications arranged alphabetically, an appendix, and an index. The account of each drug is begun with the scientific name of the drug followed by the Chinese name, a brief description of that drug and an enumeration of its uses as believed by the Chinese.

The vast number of these Chinese drugs not only includes most absurd substances from which they are derived, but also articles, such as opium, rhubarb, chaulmoogra seeds, croton seeds, cinnamon, mercury and many others, which, or products of which, are official in modern pharmacopoeias. They certainly offer a rich field of researches both for scientific elimination and discovery. The recent study of ephedrine, an alkaloid isolated from Ma Huang by one of the writers, reveals a subject possessing not only experimental interest but also clinical importance. This may serve as an example to indicate that valuable drugs may be discovered among the substances of the Chinese dispensatory.

ACKNOWLEDGEMENTS

We wish to express our thanks to Drs. A. S. Loevenhart, P. M. Dawson and W. E. Leonard of the University of Wisconsin for their valuable assistance in the diction of this paper.

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CHINA'S CONTRIBUTION TO MEDICINE IN THE PAST

By WANG CHI MIN, M.D.

HANGCHOW, CHINA

TO the uninformed the term Chinese medicine conveys a dark picture of charms, incantations and magic or of disgusting concoctions, painful manipulations, unsightly plasters and worthless remedies. Indeed, superstition and healing are so closely related that it is sometimes impossible to draw a line between them. But these are not the practice of scientific medicine. There are quacks in China just as in other countries, but the regular practitioner is one who treats diseases according to certain rules and standards and who has a clear conception of his noble calling. From this maze of folly and nonsense there is yet a rational, semi-scientific, and dignified empirical practice which is based upon the accumulated knowledge of forty centuries and which represents the thoughts and experiences of many bright minds. Chinese medicine as it exists at the present time is comparable to the situation of about the sixteenth century in Europe. However, viewed from the historical standpoint it is at least equal to, if not more profound, than that of other countries at the same period. It certainly merits deeper investigation and greater appreciation than it has heretofore received.

Many books and articles have been written on its superstitions but its more scientific aspects have scarcely been touched upon. The present short sketch attempts to deal more particularly with its proper position in history, its value and its defects, and its relation to scientific medicine. In such a brief survey as this it is impossible to give full references for the conclusions arrived at. Only the mere outline of the changes and medical thoughts of the various dynasties are herewith recorded.

Four distinct epochs may be distinguished: The epoch from the dawn of history to the end of the Shang dynasty (B.C. 1154) may be termed the ancient or legendary period. Thereafter the accounts were more authentic and the legendary developed into the historical. The period beginning with the Chow and ending with the Tang dynasty (B.C. 1000 to A.D. 959) may be styled the historical or classical period. Chang Chung-King, the Hippocrates of China, and Hua To, the most celebrated surgeon, lived at this time. From the eleventh to the seventeenth century there was a marked change in Chinese medical thought. Instead of the pedantic worship of the ancients, the publications of this period were mostly controversial in character, attacking old writings as well as current opinion. Four schools were recognized and subsequent writers all revolved around these different schools. This period may be called the medieval or controversial period. With the introduction of Western medicine in A.D. 1805 came the modern or transitional period. The most prominent feature of this period is the struggle for supremacy between the old and the new. The latter, however, is slowly and steadily gaining ground. Though it may take some time, the dawn of another golden era is looming large on the medical horizon of China.

I. THE ANCIENT OR LEGENDARY PERIOD

There are many legends concerning the founders of Chinese medicine. The first was Sheng Nung (B.C. 2737), the originator of the "Materia Medica." Like Mithridates, King of Pontus, who achieved a reputation in the art of taking poisons, he is said to have tasted seventy different kinds of poisons every day and established the art of medicine. To him is usually ascribed the writing of the "Pentsao" or "Great Herbal," which is supposed to be the earliest medical work. Sheng Nung is venerated as the Father of Medicine.

Another noted character in Chinese healing art was Hwang Ti (B.C. 2697). In conjunction with Chi Pok, one of his ministers, he is said to have written the famous "Nei Ching" or "Canon of Medicine." But historical researches proved that this work was not composed by him but was a later production, written probably about B.C. 1000. It is the most important medical classic. What the "Four Books" are to the Confucianists the "Nei Ching" is to the native doctors. Upon it is built most of the medical literature of China and so important is it considered by medical men that even at the present time, three thousand years after it was written, it is still regarded as the greatest authority. This work is the oldest Chinese medical treatise extant. It was translated into French by Dabry.

The third name to be mentioned in this legendary period is I Yin, the able and faithful prime minister of Emperor Tang, founder of the Shang dynasty (B.C. 1783). He is credited with the discovery of making medicinal decoctions.

As with all early civilizations of other countries religion and astrology merged into healing, so in China the medical profession was, from the earliest times, under the sway of priestcraft and sorcery. It was not until the Chow dynasty (B.C. 1140) that the functions of these two professions were separated. An interesting sidelight is found in the formation and development of the ancient character for doctor, I. It is composed of three parts: At the top on the left corner is a quiver, on the right corner a spear. Below is the symbol for sorcerer or priest. Thus the priest employs strong weapons to kill or expel the demons of diseases. Later this last symbol was changed to wine, signifying that the profession was no longer in their hands but taken up by the regular doctors, who administered elixirs or wines to their patients. A study of the archaic writing of Chinese characters may throw much light on the medical conditions of the various periods.

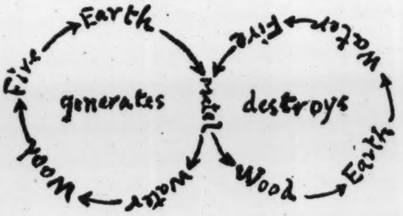
II. THE HISTORICAL OR CLASSICAL PERIOD

Reliable history does not extend further back than the middle of the Chow dynasty (B.C. 722), which is one of the most glorious periods in Chinese history. Literature, art, philosophy, government, religion, and all that is included in the term civilization flourished and reached a high degree of development. This dynasty is rightly called the Age of Philosophy, for Laotzu, Confucius, Mencius and most of the famous philosophers lived during this period. Never, before or since, have so many men of genius appeared in the same narrow limits of time. These men speculated on all kinds of subjects. Their influence was so great that it was felt in every branch of literature. Thus we find medicine no longer an effective, practical, although restricted art, based upon observation and knowledge. We see rather, masquerading under its name, pretentious systems of healing carried to an absurd and extravagant extent, elaborate systems of theoretical knowledge developing in complexity without gaining in meaning, tending to become less and less effective in practice. The study of medicine was dominated by the scholastic subtleties of visionary philosophers and was characterized by reverence for authority, petrified formalism and a pedantic excess of detail. As a result of these varied speculations on the theory and causation of diseases there were evolved two doctrines which formed the basis of the whole of Chinese medicine:

The first is the doctrine of the two principles or primordial essences, called "Yang" and "Yin." Everything under the sun is supposed to originate from them. They are generally represented by a circle named the great absolute or infinite void, which is divided into two pear-shaped bodies by a curved line. Attendant upon these diagrammatic elements are eight symbols, which are made up of a combination of triple lines, whole and broken, arranged in such a manner as not to repeat themselves. This Pah-kwa, or eight trigams, is supposed to date from Fuh Hsi (B.C. 2852), the plan being revealed to him on the back of a supernatural animal called a dragon-horse, that rose from the waters of the Yellow River. Each of the eight trigams has a special name with symbolic and fanciful meaning. But no one has been able to give a definite interpretation to them. Confucius was greatly enamored of these figures and said that if he could devote fifty years to the study of these lines he might attain wisdom. The Yang and Yin principles represent the male and female element. They stand for heaven and earth, the sun and the moon, day and night, heat and cold, life and death, positive and negative, strong and weak, et cetera, corresponding to Ormazd and Ahriman of the Zoroastrians, Osiris and Isis of the Egyptians, the even and the odd of Pythagoras.

The second doctrine is the five elements, which are metal, wood, water, fire and earth. The human frame is supposed to be made up of a harmonious mixture of these primordial substances. So long as the proportions remain proper health exists; but if the balance is disturbed disease follows. The five elements again interact on one another thus:

Metal generates water; destroys wood.
Water generates wood; destroys fire.
Wood generates fire; destroys earth.
Fire generates earth; destroys metal.
Earth generates metal; destroys water.



Corresponding with the five elements are the five organs: spleen, liver, heart, lungs and kidneys, which are further related in a complex system of arrangements to the planets, color, taste, climate, et cetera, according to the following scheme:

	Organ	*Planet*	*Element*	*Color*
1	Heart	Mars	Fire	Red
2	Liver	Jupiter	Wood	Green
3	Spleen	Saturn	Earth	Yellow
4	Lungs	Venus	Metal	White
5	Kidney	Mercury	Water	Black

	Taste	*Climate*	*Direction*
1	Bitter	Hot	South
2	Sour	Windy	East
3	Sweet	Moist	Center
4	Pungent	Dry	West
5	Salt	Cool	North

This reminds us of the humoral pathology of the Greeks, the Chinese system, however, being more complicated and profound. But let us now consider some of its more strictly medical aspects.

The first real doctor who practiced medicine and surgery was Pien Chiao. He lived about B.C. 255. It is said that he could see through the human body, revealing all the diseases of the internal organs. Some are of the opinion that this is an apparent anticipation of the roentgen rays. In the "Lietsz" the following story is related: King Wu of Lu and Tsi Ying of Chao were sick and both asked Pien Chiao to treat them. Pien Chiao gave them a narcotic wine to drink which made them unconscious for three days. He opened their chests, removed their hearts, exchanged them, and put them in again under the administration of some effective drugs. When they awoke, they felt as before, took leave and returned home. This is the earliest record of the use of anesthetics in China. Pien Chiao is also regarded as the first exponent of taking the pulse, which is considered indispensable by native doctors in diagnosis.

Massage has been practiced in China from time immemorial. Its value is fully recognized and in the Tang dynasty it was elevated to a science, forming one of the seven departments of medicine. A special chair was established with a professor in charge of it. After the Sung dynasty it degenerated till at the present day it is mostly in the hands of the barbers and the blind. Massage was first brought to European notice in the last century through the publications of the Jesuit Fathers. It is now widely practiced in various new phases, as by electromassage rubbers, steam manipulators, and so forth.

Acupuncture is also a very old Chinese method. It consists of puncturing certain points on the surface of the body. Three-hundred and sixty-seven such points are described. Perhaps more harm than good is done by its practice, as asepsis is unknown to native doctors. Acupuncture spread early to Japan and according to Remusat it was introduced into Europe by Ten-Rhyne, a Dutch surgeon, at the end of the seventeenth century, and was much extolled in France early in the nineteenth century. Recently Sir James Cantlie and others tried it for sprains and chronic rheumatism and reported very favorably on it. With further investigation it might, no doubt, prove a valuable addition to our armamentarium. In the Imperial Academy of Medicine at Peking there is still to be found a copper model pierced with holes at the proper places for puncturing. The figure is covered with paper, pasted on, and the student is required to practice needling the spot where the hole is made.

Because of the great reverence for the dead, human dissection is seldom attempted; hence gross mistakes are found in their conceptions of anatomy and physiology. The following two facts, however, are very little known and deserve mention: Dissection was described in B.C. 2697. In the Lin Shu it is stated that after death the body may be dissected and observations made as to the size of the organs, the capacity of the intestines, the length of the blood vessels, and so forth. In the Han dynasty emperor Wang Mang captured a revolutionary and ordered his physician to dissect his body. Measurements were made of the internal organs and bamboo rods were inserted into the blood vessels to see where they began and where they ended, for the alleged purpose of curing disease. Many records of this nature are described in ancient literature. The circulation of blood was known to the Chinese about two thousand years before Harvey made his discovery. At least they have a very near guess at it, for we find the following very significant passages in the "Canon of Medicine" already referred to:

> All the blood is under the jurisdiction of the heart. . . . The twelve blood vessels are deeply hidden between the muscles and cannot be seen. Only those on the outer ankles are visible because there is nothing to cover them in these places. All other blood vessels that are on the surface of the body are "loh" vessels [veins]. . . . The harmful effects of wind and rain enter the system first through the skin. It is then conveyed to the "sun" vessels [capillaries]. When these are full it goes to the "loh" vessels and these in turn empty into the big "chin" vessels [arteries]. . . . The blood current flows continuously in a circle and never stops.

The last sentence is especially significant.

State medical examinations were held in China as early as the tenth century B.C. In the Chow Rituals it is stated that at the end of each year the work of the doctors was examined and the salary of each fixed according to the results shown.

Hygiene and sanitation were also in an advanced state at this time. Wine drinking was prohibited. The law against it was as stringent as the present prohibition laws in the United States. There were special doctors to look after food and drink; dietitians, physicians, surgeons, and veterinary surgeons being the four classes of doctors. Temperance in the broad sense of the word was strongly advocated. The value of exercise was recognized. From experience they learned the law of eugenics, though its real meaning was imperfectly understood. Many very sensible rules were laid down for prenatal care. Hospitals were also established more than six hundred years before the celebrated Basilias at Caesarea in Cappadocia was founded by St. Basil. Yet in spite of such a good start the Chinese never seem to have pushed their investigations further but on the contrary have lost many of the valuable discoveries left them by the ancients.

Chinese medicine begins properly in the Han dynasty and its scientific advancement centers in the figure of Tsang Kung, Chang Chung-King and Hua To, three of the greatest doctors of China. Tsang Kung, who lived about B.C. 170, was the first to record personal observations of clinical cases. In the biographical section of the "Ancient History" we find a detailed list of his case histories from which we may have a peep into the medical thoughts of that time. Of the twenty-five cases he has left us (almost the only record of its kind for the next 1500 years) ten are reported as fatal. Unlike Galen and most medical writers, Tsang Kung was more modest, for he admitted that his prognosis was not always accurate and that he could not cure any disease unless the pulse indications were favorable. He kept these records for a double purpose: to estimate the percentage of failures and successes and also to guide in future predictions. These case histories are not to be compared with those of Hippocrates, for they are not of much scientific value. After Tsang Kung this practice of taking clinical case histories died out until the Sung dynasty, when it was again taken up with a fervor which has continued unabated to the present time.

Chang Chung-King, the greatest of the trio, was a doctor of literature in addition to his medical accomplishments. Very little is known of his life except that about A.D. 195 he was mayor of Chang-sha for some time. He is often spoken of as the Chinese Hippocrates and is venerated as the sage of medicine. His fame rests chiefly on his "Typhoid Fever," which is one of the medical classics, ranking with Huang Ti's "Canon of Medicine" in importance, and was the first book of the kind in Chinese. This work does not, as the name implies, deal with typhoid only, but with other fevers as well. In it are found 113 prescriptions. These were scientifically written, containing only a few potent drugs instead of the later "shot-gun" practice of one or two dozen inert ingredients. The antipyretic treatment of fever by cold baths was described. This antedates James Currie's method by 1700 years. Chang Chung-King was perhaps the first to employ enemas to evacuate the bowels.

Before the Han dynasty treatment was chiefly confined to acupuncture, moxa, massage and draughts. The medical writings were entirely philosophical. With the advent of Chang Chung-King, however, a new era was inaugurated. Diseases were studied more from a clinical standpoint, emphasis being laid on the physical signs, symptoms and course of an illness, the methods of treatment and the action of drugs, rather than on the theories of disease as in former times. Chang Chung-King stands above the crowd not only on account of his keen power of observation but also because of his lofty ideals. He gives to the profession a high conception of its dignity and noble mission in life. After his death scientific medicine may be said to have degenerated into dogmatic formalism. No writings of any value or originality appeared until the Sung dynasty, a gap of nearly one thousand years.

The last of the trio and a contemporary of Chang Chung-King was Hua Tu, the most famous surgeon of China. To him is usually attributed the discovery of anesthetics, though Pien Chiao employed them about four hundred years before him. It is said that he administered to his patients an effervescing powder in wine, which produced complete unconsciousness, and that he performed all sorts of operations ranging from venesection and acupuncture to laparotomy, excision of spleen, intestines and liver. A pioneer of hydrotherapy, he was also an exponent of systematic exercise and invented a system called the "frolics of the five animals." Most of the notables of that period were his patients. Among them was Kwan Kung, a famous general now deified as the god of war, on whom he operated, without an anesthetic, for a poisoned arrow-wound of the arm. King Tso Tso was another of his patrons. Hua Tu offered to cure the king's headaches by opening the skull under hashish. He was arrested, thrown into prison and later caused to be killed. Just before his death he gave all his manuscripts to the warder, who, however, dared not take them. Hua Tu then burnt his papers. Legend has it that a few leaves of his work were recovered from the ashes. These described the method of castration which is the only operation still known to the Chinese. The books bearing his name are two: "Inner Reflection Diagrams" and "The Internal Organs." In the last named is a prescription which gives the earliest account of the internal use of mercury in therapeutics.

A prominent feature in this age of science was the introduction of the four methods of diagnosis, namely, observation, auscultation, interrogation and palpation. In course of time the first three methods were not much employed, entire reliance being placed on palpation. The greatest importance was attached to this procedure and it is universally believed that any internal diseases can be revealed by feeling the pulse alone. The supposed sympathy that exists between the different points of the pulse and the internal organs are set down in the following table:

LEFT WRIST

Inch when lightly pressed indicates the state of the small intestines;
Inch when heavily pressed indicates the state of the heart;
Bar when lightly pressed indicates the state of the gall-bladder;
Bar when heavily pressed indicates the state of the liver;
Cubit when lightly pressed indicates the state of the urinary bladder;
Cubit when heavily pressed indicates the state of the kidneys.

RIGHT WRIST

Inch when lightly pressed indicates the state of the large intestines;
Inch when heavily pressed indicates the state of the lungs;
Bar when lightly pressed indicates the state of the stomach;
Bar when heavily pressed indicates the state of the spleen;
Cubit when lightly pressed indicates the state of the three passages;
Cubit when heavily pressed indicates the state of the gate of life.

The last two are imaginary organs.

Buddhism was introduced into China by Ming Ti in A.D. 68. At first, however, it made but little progress, but gradually it gained a firm foothold. The Taoists, realizing their declining influence and wishing to stem the tide of opposition, also became active. Chang Tao-ling, popularly known to foreigners as the Taoist Pope, invented charms, and incantations for the curing of diseases. Seeing the lucrative income brought in by these devices, Buddhist monks soon invented their own system of charms with the result that the people were steeped in superstition.

Similar to the conditions that existed in Europe in the fifteenth and sixteenth centuries the search for the philosopher's stone and the elixir of life reached their height during the Tang dynasty, which is often spoken of as the age of superstition. Magicians, doctors and alchemists were found everywhere experimenting with herbs and minerals in an attempt to discover a substance which could confer on the person drinking it everlasting life and beauty. Of twenty-two rulers of this period seven experimented with these elixirs and died from the effects. In this vain pursuit the time, the health and the fortunes of thousands were wasted. To these superstitious experiments, however, we owe a great deal of our knowledge of the actions and uses of many plants, especially of mineral drugs, about which the Chinese knew so little.

Chief among the alchemists was Keh Hung (A.D. 281–360) who wrote the famous "Handbook of Emergencies." This book contains an authentic description of smallpox, the first in the world, Rhazes' account, which is regarded as the earliest record, being between A.D. 860 and 932. Another famous doctor was Tao Hung-ching, the author of "Formulas of Famous Physicians," which is a work on medicinal plants. The ancient materia medica contains only 365 kinds of herbs. Tao included in this treatise 365 additional drugs, doubling the original number.

The most important works on medicine in the Tang dynasty were the "Thousand Gold Remedies" (A.D. 652) and the "Medical Secrets of an Official." The former is a book of sixty volumes by Sun Su-moh, a doctor of literature, who is immortalized as one of the genii. There is a supplement of thirty volumes which contains a full collection of incantations. The latter was compiled by Wang Chu, who was not a doctor by profession. Many formulas for demoniacal possessions and other peculiar diseases are found scattered among its pages. It consists of forty volumes. These two works sum up the teachings and discoveries up to that time. Treatment forms the chief feature of these books; in fact, they are collections of prescriptions and remedies corresponding to the modern system of treatment.

Some of the leading features of this period are given below:

Nélaton of Paris invented the catheter in 1860 but in China this was mentioned in the seventh century A.D. The "Thousand Gold Remedies" recommend a catheter of the hollow leaves of Allium Fistulosum, which is inserted into the urethra to a depth of three inches. Air is then blown into it. One doctor, mentioned in the "Precious Mirror of Hygiene," used an empty pig's bladder with a quill tied to it. For obvious reasons such a crude instrument was attended with risks and it is no wonder that it soon fell into disuse, until at the present time native doctors scarcely know its name.

The idea of vaccine therapy seems to have been discovered. One such instance is recorded in which the patient's own pus was taken and injected under the skin around the original sore.

Organotherapy, formerly much ridiculed by foreigners and now hailed as a valuable modern discovery, is known to every Chinese housewife. The use of sheep thyroid for cretinism, goiter, and so forth, is mentioned in the sixth century. Even psychotherapeutics, so much in vogue nowadays, was practiced as early as the second century B.C. in the form of charms and incantations.

The fame of Chinese medicine during the Han and Tang dynasties spread far and wide. It is recorded that in A.D. 609 Japan sent Dr. Fuyiwaiyi (?) and others to study medicine in China, where they stayed for fifteen years.

III. THE MEDIEVAL OR CONTROVERSIAL PERIOD

As has been pointed out, the Chinese have a great reverence for authority. What the ancients say is regarded as always right. None dares to question the accuracy of their statements. This veneration of the ancients amounts almost to a worship and is the chief cause of the scarcity of original writings and the petrified fixedness of Chinese Medicine. In the beginning of the Sung dynasty a marked change is noticed. The practice of medicine became more intensive and specialized. Monographs on particular diseases began to appear. The number and variety of publications in this dynasty exceed that of all the previous dynasties put together; many of them are quite original. A selected list of the more important works is given below:

1. Tung Keh. Treatment of Beri-beri. 2 vols. The first and only monograph on this subject.
2. Chen Chih. Care of the Aged. The earliest treatise on hygiene with special reference to the care and feeding of old people.
3. Chen Chi-Ming. Textbook of Women's Diseases. 24 vols. A special work on diseases peculiar to women. The first of its kind in this branch of medicine.
4. Obstetrics. 2 vols. Author unknown. This is the earliest monograph on this important subject.

5. Chen Yin. Three Causes of Diseases. 18 vols. A standard work on pathology.

6. The Fontenel. 2 vols. Anonymous. It is said that the success of Chien Yueh, the greatest doctor on children's diseases, was due to a thorough knowledge of this book, which is the earliest special treatise on diseases of infants.

7. The Copper Model. 7 vols. Also anonymous. The first practical handbook on acupuncture.

8. Li Shun. On Carbuncle. 1 vol. An interesting monograph.

9. Royal Infirmary Model Essays. 9 vols. Author unknown. It is a collection of examination papers.

10. Chang Kuo. Medical Miscellany. 10 vols. Contains much that is of interest. Useful for reference.

11. Imperial Cyclopedia of Medicine. 200 vols. Compiled under imperial orders by a staff of medical men. A remarkable work but unfortunately most of the volumes have been lost.

The distinct features in this dynasty are the inoculation against smallpox, which was discovered in 1022, the establishment of medical schools and the holding of state medical examinations in 1068. Gradually the schools declined and then ceased to exist until 1280, when they were revived by Imperial decrees. State examinations were also discontinued for some time but reintroduced in 1317.

After the Sung dynasty another change is noticed. The publications became controversial, attacking old writings as well as contemporary literature. Four distinct schools may be recognized: Liu Shou-Cheng propounded the theory that diseases were caused by excessive heat in the body and advocated the use of cooling medicines. Chang Tzu-Ho was famous for his "attacking" policy. He compared diseases to a foreign substance in the system which should be attacked and driven out by drastic drugs such as purgatives, emetics and diaphoretics. Li Tung-yuan emphasized the importance of the spleen and stomach and put down the causes of all disease as due to derangements of the digestive tract. Chu Tan-chi thought that malnutrition was the root of all troubles; hence he extolled the value of tonics. These famous men are called the "Four Great Doctors of the Kin Yuan Period." Later writers like Sih Lih-cha, Chen Hsiu-yuan, Chang Ching-yoh and others only revolved around the different schools.

An important contribution to medical science in the Ming dynasty was the publication of the "Pen Tsao Kang Muh" or "Synopsis of Ancient Herbals." This standard work, compiled by Li Shi-chen, a district magistrate, born at Ki-chan, a town in the east of the province of Hupeh, consists of fifty-two books and took the author thirty years to complete. All known works on materia medica, to the number of forty-one, were consulted, while references to 360 medical treatises, and 591 other scientific and historical works were freely made. There are 71,096 formulas given in this work and the substances enumerated include 1892 kinds. These are arranged in sixty great classes under sixteen orders. This treatise is one of the most popular and important books in Chinese medical literature and merits the praise accorded to it by doctors as well as laymen. The "Synopsis of Ancient Herbals" was published in 1590. Another valuable book is Wu Yiu-Ko's "On Plague," which is a special treatise on fevers and epidemic diseases. It contains many original observations and suggestions.

In some quarters it is declared that syphilis originated from China, but this is not supported by fact. Most Chinese writers of this period maintained that it was unheard of in China till the middle of the sixteenth century and that it was introduced into Canton by Portuguese from India. These statements, though not strictly true, as there are other references recording its presence earlier than this date, show that syphilis was most prevalent in the Ming dynasty. Indeed, the descriptions of this disease were very accurate and illuminating and in one interesting monograph written in 1631 the various manifestations and the hereditary transmission of syphilis are mentioned in full detail.

IV. THE MODERN OR TRANSITIONAL PERIOD

Transitional is a fitting term for the Tsing dynasty, for during this period Chinese medicine showed a gradual and perceptible decline until 1805, when it received a fresh shock by the introduction of Western medicine. Struggling under the yoke of an alien race, naturally the scientific advancements made could not be compared with other dynasties. Emperor Kien Lung, however, was a great patron of literature and as a result of his encouragement the "Golden Mirror of Medicine" was produced. This is a sort of encyclopedia of medicine and surgery, compiled by a committee of doctors at the order of the emperor. It summarizes the corrections and revisions of many ancient works and epitomizes all the recent methods and discoveries. The "Golden Mirror" is regarded as a standard work.

An interesting figure of this time was Wang Hsun-shan, who is sometimes styled the reformer of Chinese medicine. He was the author of "Corrector of Medical Errors," a remarkable little work which contains many ingenious opinions concerning anatomy and pathology, based on forty-two years' medical experience and the observations of thirty decapitated human bodies. Unfortunately, the corrections are more erroneous than the original. The book, though of not much scientific value, is full of original ideas, his opinions on the causation of hemiplegia, and on the brain as the organ of thought, being especially interesting.

The Western method of vaccination was introduced into China in May, 1806. It was brought over from the Philippines to Macao, whence it spread to Canton and other places. It is remarkable that a century before Jenner's epoch-making discovery the Chinese seem to have had an idea of vaccination, for in the "Synopsis of Ancient Herbals" the use of cow fleas for the prevention of smallpox is mentioned. It is not at all impossible that the fleas of a cow affected with variola, when taken by the mouth, might have the same effect as vaccination. That this treatment was once popular proves that there must be some efficacy in it. Had there been a Chinese Jenner to follow up this valuable clue the discovery of vaccination might have been made earlier and millions of lives saved.

In 1805 Dr. Hobson, an Englishman, came to Canton to be followed later by Drs. Parker, Kerr and others. Silently and steadily these pioneers of Western medicine worked their way and in spite of the proverbial conservatism of the people it has now gained a firm foothold. It would be impossible for a short article such as this to do justice to the eventful period under review. Here only a few historical landmarks will be given.

The first Chinese who studied foreign medicine abroad was Wong Cheuk Hing. A native of Canton, he was born in 1832 and obtained his English education in Macao and Hongkong. In 1840 he followed a Mr. Brown to America for further studies, where he stayed for four years. After his graduation in literature he went over to Edinburgh to study medicine, receiving his degree in 1855. Two years later he returned to China and worked in the various hospitals in Hongkong and Canton until his death in 1878.

With the return of a number of graduates from Japan in 1899 a new situation was created. Hitherto all medical work was entirely in the hands of European and American doctors. Through the writings and influence of this new body of men, Japanese medicine and especially Japanese medical terms became popular. They founded schools and hospitals and gradually developed into a new force in Chinese medical matters. Many of them are now holding important Government positions.

The new era in modern preventive medicine may be said to have dated from 1911. The great pneumonic plague in Manchuria demonstrated to the people the great superiority of Western science as compared with the old native methods for the suppression of plague. Since that time many laws governing the notification of infectious diseases, the standardization of medical education, the dissection of dead bodies, the registration of medical practitioners, the sale of narcotic drugs, and so forth, have been passed. In 1914 the National Medical Association of China, which has for its members the most prominent graduates from European, American, Japanese and Chinese colleges, was founded. Prior to this teachers and authors had great difficulty in their work because of the lack of uniform scientific terms. In 1915 a Terminology Committee was appointed consisting of representatives of the Ministry of Education, National Medical Association, Medical and Pharmaceutical Society, Medical Missionary Association, and Kiangsu Educational Association, to determine the terms to be used throughout China. In order to promote public health and sanitation among the masses a Joint Council of Public Health Education was formed in 1916, consisting of representatives from the National Medical Association, Medical Missionary Association, Y.M.C.A., Y.W.C.A., and China Christian Educational Association. All these organizations are doing splendid work toward the medical progress of China.

The formal opening of the Union Medical College and Hospital at Peking on September 15, 1921, adds another chapter to the annals of medicine in this country. The whole plant covers an area of about ten English acres and cost approximately five million dollars gold. It is the finest medical school in the Orient, not only in the magnificence of its architecture but also in the completeness of its outfit. Great things are expected of this institution.

In conclusion the highest tribute must be paid to the missionary doctors, who were the earliest to found hospitals, organize schools, promote public health and hygiene, and so forth. They have brought a new light and a new hope to the teeming millions of suffering humanity. Though handicapped by insufficient funds, lack of proper equipment and other adverse conditions, these men labored with incessant zeal, gradually gaining ground until Western medicine attained its present position. The institutions they founded are scattered throughout the country. They are not only centers of healing but are also factories of learning, whence, every year, a small army of trained men are sent out to join those in the field to fight the demons of ignorance and disease. Inspired by the noble efforts of these pioneers, the Government and other public bodies have started to establish hospitals and schools of their own. Some of these are well organized and fully equipped. In the years to come the work of the missionary doctors may be eclipsed and eliminated. But their great contribution to medical advancement and to human progress in China will forever remain.

Such is a brief epitome of medicine as it has existed and been practiced in China. While the Chinese anticipated many discoveries, collected a great variety of facts, invented some valuable methods, and brought a few to a high degree of excellence, they have never pursued a single subject in a way calculated to lead them to final success. The circulation of blood, anesthetics, roentgen rays, vaccine therapy, massage, catheters, hypnotism, hydrotherapy, hygiene, organotherapy, and so forth, had all been hinted at but remained barren of results until centuries later Western science stepped in and secured the prize. The field of Chinese medicine is still a veritable virgin soil. There are golden opportunities for research workers to break open its hidden wealth of treasures. The day will come when Chinese medicine will pass through this stage of transition to emerge once more, purified and strengthened, and lead again the medical thought of the world.

[From Wirzung; General Practise of Physicke, London, 1605.]

EDITORIALS

THE MEDICAL HISTORY OF LOUIS XIV

There has recently been manifest a growing interest on the part of writers on historical topics and their readers, in the medical aspects of the lives of those who have figured in the history of the past. Thus we have had volumes of post-mortem clinics and many articles in magazines in which the ailments and physical defects of some of the most eminent historical characters have been laid bare to the perhaps somewhat morbid curiosity of the present generation. As an instance of the value of such studies one that has recently appeared, dealing with the medical history of Louis xiv,[1] by Dr. Deguéret is a good example. In 1862 Le Roi, the conservator of the Library of Versailles, published the *Journal de la Santé de Louis* xiv, which was written by his physicians Vallot, d'Aquin and Fagon, and it is on this work that most of the information given by Deguéret is based, although he has added to it from other sources. As he states in the Introduction, his study leads to no very important historical conclusions, but it gives the reader an invaluable insight into the medical practice of the time and throws much curious light on the state of the profession. The delicious ridicule with which Molière has drawn the portraits of the leading physicians of France has unfortunately served to obscure their real position, and the ridiculous characters of his comedies are known to many thousands who are altogether ignorant of the fact that their prototypes were really scientific men according to their lights. We owe to the court physicians of Louis xiv the introduction into medical use of ipecac, antimony and quinine and their practice was by no means so foolish as it is made to appear by lay writers. Deguéret is particularly severe in his strictures on M. Louis Bertrand, a chief offender in this respect. Bertrand has just published a most interesting life of Louis xiv, which has been widely read and received with great applause by the critics; nevertheless he is most unjust towards the medical men of his court, and has especially attacked them in an article entitled "Louis xiv et ses Médecins," which appeared in the *Revue Universelle* of September 1, 1923. Deguéret points to many instances in which Bertrand reveals a lack of knowledge of medical matters, which has led to his making erroneous statements regarding them.

Louis xiii and Anne of Austria seem to have both enjoyed excellent health for sometime previous to the year 1638, in which Louis xiv was born. Louis xiii died five years later of what was probably tubercular peritonitis and Anne in 1666 of a cancer of the breast. Louis xiv was a strong, healthy infant. He was born with two teeth and it is solely recorded that his wet-nurses suffered much from his voracity and the bites with which he inflicted their breasts in gratifying it.

Louis xiv apparently escaped all the usual infantile maladies, but in 1647, when nine years old, he had a very severe attack of smallpox. He was attended by Vaultier, then *premier médecin du roi*, who called in the Séguins, uncle and nephew, and Vallot and Guénault, as consultants. Louis recovered but with some pitting on the face. At an early date Louis commenced the series of amours which he continued until an advanced age. In 1657 he suffered from a severe blennorrhagia for seven months, as a consequence of one of the miscellaneous love affairs in which he was wont to engage with servant girls and others. The following year he was desperately ill with typhoid fever at Calais and his recovery was attributed by his physicians to their administration of antimony, a drug which had been formally condemned by the medical faculty of Paris, who had prohibited its use. Professor Ménétrier says that antimony thus received its "lettres de noblesse," and henceforth came into general use—which led to its general misuse. In 1663 the Queen had measles and Louis xiv contracted them from her. He had a very severe attack and Vallot attributed his recovery to a venesection which was performed at the time when the disease was at its height. Louis xiv suffered from intestinal parasites which have given rise to much amusing literature. Dr. Deguéret states that the historians, Louis Bertrand and G. Le Notre, have endowed him with a tapeworm of proportions to suit his royal magnificence. These two authorities have both condemned the physicians of Louis xiv in the most unmeasured terms, regarding them as ignorant charlatans. Deguéret comes to the defense of the royal physicians and proves that in this instance at any rate the historians, through ignorance of medical matters, have drawn false conclusions. Louis did not have a tapeworm but he did on a number of occasions pass round worms. The many jests which have been current on the royal tapeworm were kept up by the immense appetite with which he was endowed throughout his life. His teeth caused him considerable difficulty and there are many records of their being abscessed or diseased. In 1682 he began to suffer from gout, which remained a serious enemy until the time of his death. In 1683 Louis dislocated his left elbow by a fall from a horse. Three years later, in 1686, he rendered a great service to surgery by permitting Felix, his first surgeon, to operate on him for *fistula in ano*. The operation was completely successful and made the fortune of Felix, on whom the King conferred the estate of Moulineaux and 40,000 crowns. But its benefits to Felix were even more considerable because the courtiers were many of them seized with an ardent desire to undergo the same operation as the King. Dionis, the other leading French surgeon of the day, states that he had seen more than thirty who had been angered by his declining to operate on them because he could find no reason to do so.

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[1] Deguéret, E. Histoire Médicale du Grand Roi. Paris, 1924.

One of the favorite royal residences was Marly, a beautiful place, but surrounded by many small ponds and streams in which bred innumerable mosquitoes. For some years the King suffered from fever with chills during his sojourns there. This condition was finally completely relieved by the administration of cinchona.

In 1696 Louis suffered an attack of what Dr. Deguéret calls anthrax, although the description by Fagon reads very much as though it was a severe carbuncle. As he grew older Louis became a terrible sufferer from gout and was greatly troubled with gravel in his urine. He developed arteriosclerosis, with atheroma of the vessels, and died in 1715 of a gangrene which involved the left leg. As Garrison[1] well says: "Louis xiv influenced French medicine in three curious ways: His attack of typhoid fever (1657) gave an immense vogue to the use of antimony; his anal fistula (1686) brought about the rehabilitation of French surgery; and the fact that his mistress was attended by Clément, the royal accoucheur, in 1663, did much to further the cause of male midwifery."

NEW VIEWS OF MAX WELLMANN ON THE AUTHORSHIP OF CELSUS

In 1913, the eminent philologist, Professor Max Wellmann, who now occupies the chair of medical history in the University of Berlin, published his well-known investigation into the origins of Celsus. The substance is to the effect that this mysterious text, the most complete, compact, readable and informing encyclopaedia of medicine and surgery which has come down to us from antiquity, bears in its every line, paragraph and page, the internal evidence of Greek provenance. That it may have been a section of a larger encyclopaedia of agriculture, military science and other matters of interest to Roman gentlemen, prepared as such by a member of the *gens Cornelii* who lived during the reign of Tiberius Caesar, is quite within the range of probability. But whether a transcription, a translation or a compilation, its subject matter derives from Hippocrates, Asclepiades, his pupil Meges and Heraclides of Tarentum, as Wellmann has clearly established by placing parallel passages in juxtaposition. His initial inference was that the Greek original was probably written before 26 A.D. by Cassius Felix, a body-physician to Tiberius Caesar. A Latin translation of the text of Cassius was edited by Valentine Rose and published by Teubner (Leipzig) in 1879.

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[1] Garrison, F. H. History of Medicine. Ed. 3, Phila., 1921, p. 298.

In an article recently published[1] Wellmann advances to what seems, on the face of it, a stronger, surer and likelier assumption. His argument, which I translate on account of its intrinsic importance, reads as follows:

> In the First Century, B.C., after the temporary eclipse of the great Alexandrian school, Greek medicine experienced a new lease of life through two men of entirely different type, Asclepiades of Prusa (Bithynia) and Heraclides of Tarentum. Asclepiades, a man of the world, a cosmopolitan of exceptional rhetorical training, who impressed all and sundry by his knowledge of good form and was a welcome guest in the proudest Roman circles in the last decade of the pre-Christian era, became through his teacher Aenesides, the founder of a sect of rational sceptics. Heraclides, a modest silent scholar, living within the narrow enclave of his Alexandrian associations, and devoted only to the welfare of his fellow creatures, was, through his master Themison, the originator of the sect of Methodists. One was, even in his lifetime, a celebrated physician, courted by kings and held in awe by the people as an ambassador from heaven, because he once raised a man from the dead. The other has only come to be appraised at his true value by posterity. Asclepiades was the most logical and convincing protagonist and champion of mechanistic views and solidistic hypotheses in pathology, a revolutionary and an innovator in therapeutics, an exponent of physiological or rational modes of healing, a scorner of tradition, who held that all problems may be resolved from their logical premises. Heraclides, an enthusiastic supporter of the outworn humoral pathology, penetrated with deep reverence for the achievements of the past, was inclined to recognize as valid only what he and his predecessors had ascertained by their own observations, experiences and experiments.
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> Fundamentally different, even diametrically opposed as were the doctrines of these two great physicians, there had been, none the less, an early attempt to harmonize and compose them. On the authority of Galen (XVI, 82), this attempt originated with the Empirics. The earliest protagonist of this tendency known to us is the author of the medical hand-book which has come down to us under the name of Celsus. The true significance of this book lies in the consequential blending of dogmatism and empiricism which informs it everywhere. It is highly edifying and indicative of no small amount of mental labor that the author has so successfully harmonized two entirely different ways of seeing medical problems, while at the same time the bright star of Cos shines over all as the supreme authority. And that is accom plished in such a polished, witty manner, with such clear, formal logic, that the clever skill displayed in soldering incompatibles to make them kiss, keeps us in a constant state of suspense, as we admire, at the same time, the many words of wisdom which are interwoven in the argument. I recall one of the best known: *Levia ingenia, quia nihil habent, nihil sibi detrahunt.* There can be no manner of doubt that this book is the masterpiece of a highly cultivated, intellectual physician of wide knowledge, and yet it goes under the name of a Roman grammarian and litterateur, who bore the reputation of making the intellectual achievement of the Greeks known to his countrymen, the name of

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[1] *Arch. f. Gesch. d. Med.*, Leipz., 1925, XVI, 209–213.

A. Cornelius Celsus, whom Columella, a competent critic of a generation later, dubbed "a man of mediocre talents" (*mediocri vir ingenio*). How are we to account for this contradiction? That Celsus was not reputed a physician, but wrote his "Libri octo de medicina" (known to be only an important part of a great encyclopaedia) as a layman, is now admitted by everybody. In my book on Celsus, I went a step further and defended the thesis that the work is of Greek origin and that to Celsus belongs only the credit of selecting his material and translating it. Two further arguments will serve to strengthen this thesis. A salient characteristic of the entire work is the positively bewildering familiarity of its author with the Hippocratic writings. On almost every page, he draws upon his recollection of the great Coan, partly in his mode of expression, partly in the thoughts which flow from his pen. Whoever knows his Hippocrates in this thoroughgoing way, not only in his head, but through the capacity to bring his ideas into the right relation with the rest of the text, he truly has stood in a deep, intimate relation with the master, he has read him again and again, he has studied him, and by this token, he must have been himself a physician. What settles the whole question, however, is a voice from the antique world. Among the many letters which have come down to us prior to the work of Marcellus Empiricus ("De Medicamentis"), there is an epistle from Celsus to Pullius Natalis, which sets forth the dedication to a translation made by Celsus of a Greek medical formulary. Very little attention has been paid to this epistle, which has even been regarded as apocryphal *in toto*. Only Theodor Puschmann had the courage to draw attention to it, on account of its great antiquity and its not inconsiderable literary importance. We have no reason to doubt, in fact, that this dedicatory epistle, just as much as the preceding one of Scribonius Largus to C. Julius Callistus, is genuine. The *gens Pullia* does not appear in Rome before the first empire (Augustus Caesar). The basic principles established by Celsus in this letter about the translation of the Greek recipes (viz., to begin the prescription not, as ordinarily, in the imperative, but to express it in the subjunctive), is carried equally in the "De Medicina," and his remark that in translating this Greek formulary he has avoided the *cultus orationis*, implies a definite allusion to his principal work. In this epistle, then, Celsus plainly defines himself as a translator of Greek medical writings. The original of his book of recipes will reveal itself in the following. Piety impels me, in this connection, to recall the name of Julius Pagel, who was snatched away, all too soon alas, from a life of scientific endeavor. As early as 1907, Pagel, in his review in the Virchow *Jahresbericht*, referred, with a flash of intuitive perception, to the possibility that "Celsus, without much scruple, made a pure and simple translation of his Greek original."

The question of this Greek original, therefore, comes up again, a question which finds its ample justification in the fact that it is inconceivable that a physician so considerable and so intelligent should have left no trace of his activity in the rich array of literature which has come down to us from the First Empire. I will begin to answer this question by assembling the internal evidence from the book itself, as I have already done in my monograph on Celsus:

1. The author was a physician enjoying highest consideration in Rome, who, in consequence of his social position, was familiar with the ailments of the best society.

2. He lived in the reign of Tiberius and probably in the last years of Augustus Caesar. He is not acquainted with the Pneumatic School, founded by Athenaeus of Attaleia, about 20 A.D.

3. He has very definite leanings toward pharmacology.

4. His work was a general introduction to the study of medicine for the use of physicians and laymen.

5. He was neither a Dogmatist nor an Empiric, nor yet an adherent of the school of Methodists, but founder of a new sect of peculiar type (haeresis, therefore a heresiarch), which mediated between therapy (*logos*) and empiricism (*empeiria, enarges techne*), i.e., between the Dogmatism which sought to establish the true, if hidden causes of disease and the experimential doctrine of the Empirics, which contented itself with trying to ascertain the immediate, openly revealed causes, the *phenomena* or *enarge*. This follows from the passage in which the peculiar standpoint of the book is specified, near the end of the introduction.

If, now, we take stock of the great number of physicians active in literature at the date of inception of this work, only Cassius, Eudemus and Tiberius Claudius Menecrates, all court physicians to Tiberius, will seem eligible to the connoisseur. In my monograph on Celsus, I decided, I repeat once more, with many reservations in favor of Cassius Felix. That was an error. Before the tribunal of thoughtful, riper judgment, it has no *locus standi*. Eudemus is out of the question because as a pupil of Themison of Laodicea he was a Methodist. But Menecrates, on the other hand, meets all the requirements of the criteria of identification apparent in the work itself. Hitherto, we have known of this physician only through Galen. Our first intimation of his importance and his status in the history of medicine comes from an inscription discovered as an epitaph on a marble altar on the site of the gardens of San Paolo fuori in Rome and published as No. 6607 in the "Corpus inscriptionum." It reads: "To Tiberius Claudius Menecrates of the Quirina clan, physician to the Emperor and founder of a dogmatic-empiric sect of his own (*ἰδίας λογικῆς ἐναργοῦς ἰατρικῆς κτίστῃ*), the doctrine of which he has expressed in 156 books of his writing, in consequence of which the most famous cities have distinguished him by decrees of honor, his pupils (*οἱ γνώριμοι*) dedicate, as to their heresiarch, this Heroön." This Menecrates was, then, body physician to Tiberius and to the succeeding emperor (Κ*ἰατρὸς αισάρων*), as court physician, he naturally maintained an exceptional status in Roman medical circles of the period and, along with his practice, was remarkably prolific in literary output, as was common among physicians of consequence under the Empire. We know of one of his writings through Galen, viz., a formulary, bearing, by reason of its dedication to the Emperor, the proud title "Autokrator," and in which the weights of the different ingredients of medicaments are given verbally, with the practical object of securing the correct numerals in each case. Hence the title of the book: "Autokrator hologrammatos." As Galen relates, such prominent pharmacologists of the Flavian period as Damocrates, the younger Andromachus and Asclepiades (ὁ Φαρμακίων) draw upon this book for recipes. Is it pure chance that one of these recipes, due to a forgotten physician, Ctesiphon (Galen xiii, 936), crops up again in the pharmacological section of Celsus? But what is most decisive is that Menecrates is commemorated in our inscription as founder of a new medical sect, characterized by the very trait which is the most exquisite feature of the book of Celsus himself, viz., fusion of Dogmatism with Empiricism (λογικὴ ἐναργὴς ἰατρική), and limitation of etiology to what is most obvious and accessible (the *phenomena* or *enarge*). In the end, we can readily believe that this man, whom Damocrates, in the period of Nero and the Flavian emperors, characterized as "a man of highest skill in the practice of medicine" (ἀνὴρ κράτιστος ἐκτικὸς πρὸς τὴν τέχνεν), to whom his pupils erected a Heroön in Rome in token of reverence and gratitude, was really a physician of consequence.

But let us not forget to be grateful to the translator. What he accomplished cannot be praised enough. His simple, clear, noble, often rhythmic diction will be the delight of everyone who reads him, as long as there are cultivated people in the world. Whoever reads him with attention and is in position to sense something of the pulse of the Greek spirit beneath the foreign trappings, of the truly Greek genius for casting ideas and words into artistic shapes, will not forget the truth of the poet's line: "Unter gehend sogar ist's immer dieselbige Sonne." (Even as it sets, the sun is still the sun.)

It would ill become one occupied almost exclusively with the literature of modern medicine to pronounce upon the above utterance of a great classical scholar. Professor Wellmann's reading of Celsus shows us the proud Roman, of the Cornelian clan, as the elegant and sympathetic translator of a Greek manuscript the authorship of which, let us hope, may not even have been known to him. The very quality of Celsus' translation suggests, somehow, that he was an honest gentleman. The copying of manuscripts by slaves and their constant thumbing by circulation (the only way in which papyric scrolls could then be "published") may well have submerged the name of the author in a case of this kind, in which Menecrates wrote a work of 156 books (sections), of which Celsus may have had access only to a fugitive fragment (the eight books he translated). Celsus, then, illustrates that phase of medical literature which Sudhoff has so well elucidated, namely that in all early (virtually primitive) phases of medicine, the author, as such, is non-existent, comes into his own only in periods of developed civilization, such as the Periclean, the Augustan or the Renaissance, begins to disappear under the names of translators, compilers and financial exploiters, in periods in which a civilization begins to wear out and acquire a sleepy pear flavor, e.g., the downfall of the Roman Empire. As Sudhoff has shown, this process of submerging the real author under the name of the exploiter characterizes the bulk of anonymous literature of the Middle Ages up to the Renaissance. Those in the know could even produce some amusing examples of this tendency in recent medicine. Ochsner has recently stressed the fact that the highly respectable *Arbeit* is in danger of becoming a sheer, bulky compilation. We are prone to forget that some *Arbeiten* of Pasteur or Claude Bernard or Johannes Müller or Helmholtz, discoveries of utmost moment to medicine, consist of only a few lines or pages of print. There have been cuckoos who amused themselves by passing off their own works under other men's names, and there be inverted cuckoos who are fain to pass off the works of other men as their own.

FIELDING H. GARRISON.

BOOK REVIEWS

Development of Our Knowledge of Tuberculosis. By Lawrence Flick, M.D., L.L.D. Philadelphia, 1925.

This volume is a comprehensive history or resumé of all that has been known about tuberculosis from the earliest known records to the present time. The Author considers briefly references in the Code of Hammurabi, in Egyptian papyri and in ancient Chinese literature, which seem to point to the existence of tubercular disease in the human being many thousands of years ago. In Greek medicine from Hippocrates on, many conditions which Flick considers must have been tubercular are well described. Indeed he says: "Apparently they saw everything about the disease which we saw before the discovery of the tubercle bacillus but they did not interpret what they saw as we did." After reviewing the leading Greek literature on the subject, Dr. Flick considers what the Romans knew about tuberculosis and shows that the disease was prevalent in many forms among them. But, as he points out, they described various tubercular lesions as different types of disease. Thus Galen describes tuberculosis under such headings as phthisis, hectic fever, tabes, marasmus, phthoe, phyma, struma, hemorrhage and atrophy. These descriptions are, of course, clinical and not based on any pathological observations. The first real advance in the knowledge of tuberculosis from the time of Galen was not made until Francis de le Boë, or Sylvius, of Leyden, between 1648 and 1672, published his postmortem findings. Sylvius was the first who wrote clearly of tuberculosis of the lymphatics, his description of tuberculosis of the glands showing how correct were his interpretations. The next landmark was made by Richard Morton in his book "Phthisiologia," of which the English version was published in 1694. Dr. Flick devotes many pages to a very full analysis of the contents of Morton's work, which, based on extensive clinical observation and numerous autopsies, was a tremendous advance on all previous writings on the subject. Flick says of it: "Clinically, it is the best presentation of the symptomatology of tuberculosis that has been written." Proceeding to a consideration of the knowledge of tuberculosis in the eighteenth century, Dr. Flick quotes some laws which were enacted in Spain, clearly declaring tuberculosis a contagious disease and ordering measures to prevent its spread.

In 1761 the publication of Leopold Auenbrugger's little book announcing the value of percussion as a means of studying the thoracic viscera marked a new epoch in the study of pulmonary tuberculosis. Unfortunately his discovery was but little known until Corvisart, many years later, translated his pamphlet into French and published it. Flick next mentions the writings of Stark and Reid. Stark proved that tubercles were not lymph glands as had been believed heretofore. Reid's work was largely compiled from Stark. The writings of Hufeland, Baillie, Portal, Beddoes and Benjamin Rush are considered at length. The greatest original writer on tuberculosis of his time was Gaspard-Laurent Bayle, who, like his great contemporary Laënnec, fell a victim to tuberculosis himself. Bayle published in 1810 the results of nine hundred autopsies on persons dead of tuberculosis, many of whom he had also studied during their lives. René Théophile Laënnec, a friend of Bayle and also a student of Corvisart, did more than any of his contemporaries to further the knowledge of tuberculosis not only by his discovery of auscultation but also by his clinical and pathological researches. Flick directs attention to the emphasis which Laënnec laid on the curability of tuberculosis although at the same time he was careful to point out that the art of curing it by therapeutic measures was as yet unknown. The views of Bayle and Laënnec encountered opposition especially from Broussais and Andral. Fortunately these two opponents could not stem the tide of enthusiasm which was excited in all countries by the scientific methods of study which had been promoted by the two young geniuses whose lives had been too early sacrificed to their cause. The great Louis supported the new views and brought to their aid his own splendid scientific methods. The next great event in the history of the study of tuberculosis was the publication in the decade between 1860 and 1870 of Villemin's studies, in which he proved the specific nature of the tubercle and the inoculability of the disease, and that it was due to a living agent. It was not, however, until 1882 that the tubercle bacillus was isolated and its relationship to the disease proved by Robert Koch. Dr. Flick devotes many pages to the various steps in the microscopic study of tubercular tissues which at last led to the great discovery. From its date the study of tuberculosis has assumed an entirely new aspect. The concluding part of Dr. Flick's book is given over to a résumé of the discussions concerning the problem of the difference between bovine and human tuberculosis, and whether one is transmissible to the other.

Dr. Flick was one of the pioneer workers in the campaign which for more than a quarter of a century has been waged against the Great White Plague. Few have studied the subject more profoundly than he or have done more to make practical use of the vast amount of laboratory work which has been done since Koch's discovery. For this reason he has written a book of much more practical value than is usually found in historical epitomies. This is especially noteworthy when he is relating the history of some of the erroneous opinions which prevailed in the past concerning the nature of the disease and the methods of cure. The simple and direct manner in which Dr. Flick presents his material makes it delightful reading and the care with which he has covered the literature renders his book of the greatest value for reference purposes. There are certainly few doctors who can afford to neglect any source of information on a disease which rises up to confront them in one form or another in every branch of practice. Therefore this book can be read by every member of the profession with profit, and we trust it will be.

FRANCIS R. PACKARD.

ENTWICKLUNG UND BIBLIOGRAPHIE DER PATHOLOGISCH-ANATOMISCHEN ABBILDUNG. Von Edgar Goldschmid, Prosektor am Senckenbergischen Pathologischen Institut und Professor an der Universität Frankfurt a. M. Mit 44 Lichtdrucktafeln, davon 28 Farbig. Verlag Karl W. Hiersemann, Leipzig, 1925.

This is a praiseworthy effort to do for pathological anatomy what Choulant did in his magnum opus, edited in English by the late lamented Mortimer Frank, for normal anatomy.

Real pathological anatomy began with Morgagni in 1761 when his great work, "De Sedibus et Causis Morborum," appeared. But pathological anatomical illustration, like every other type of illustration, began long before there was a scientific book on the subject. Thus we have representations of disease upon old vases, steles, in old manuscripts and in papyri and mural decorations. There are likewise the ex-votos, which are of considerable importance in connection with the representation of morbid conditions by the ancients. Purposive illustration in pathological anatomy started with John of Ketham, a German living in Italy toward the end of the fifteenth century. Ketham's work has recently been republished. Beginning with Ketham, Goldschmid carries the history of pathological anatomical illustration down to our own times. The greatest work is that of Cruveilhier, which appeared in 1829 and which has never been surpassed either in accuracy of detail or in perfection of lithography.

In a section on bibliography Goldschmid gives in chronological order, beginning with the year 1517, the date of publication of Gerstoroff's (also called Schylhans) "Feldbuch der Wundartzney," a list of books containing illustrations of morbid conditions. After the full title of the work a brief description of its contents is given, with a few details of the author's life, the process used in illustration, and the name of the illustrator and publisher.

This section is followed by a useful index of artists, printers and publishers. The last portion of the book comprises a series of beautifully reproduced plates illustrative of the different epochs in pathological illustration. Some are in black and white, some in colors. These pictures should prove a great help to teachers when actual cases or specimens are not available.

The book is a credit alike to author and publisher. It is bound in red morocco and highly ornamented cloth—a more sedate cover design would not have been amiss.

David Riesman, M.D.

Les Curiosités de la Médecine. Par Le Docteur Cabanès, Librairie E. Le François. Paris, 1925.

In 1900 Dr. Cabanès published a book with the same title as the present but, as he is careful to explain in an *avant-propos*, this is by no means a new edition of the other book, but is an entirely new work. This volume deals with the curiosities and anomalies of the skeleton: the head, trunk and members, and its muscular and cutaneous coverings. A second volume will deal with those of the organs of sense and a third volume with those which are observed in the various functions of the body.

The Author has succeeded in compiling and classifying a remarkable quantity of curious information and many amusing details on his subject, especially as regards some of the anatomical or pathological characteristics of famous persons. It is impossible to attempt a selection of quotations from such a mélange, but as examples of the method employed in the grouping of his material we might instance his discussion of the question of the height of man. He gives statistics and details as regards the relative heights of the different races of mankind; of the various ranks of society: peasants, middle class, aristocracy; of the sexes, and studies the stature of famous men such as Napoleon and his marshals. In the section devoted to the skin there are interesting details regarding the problem of stigmata, and on the custom of tattooing. The hair is a structure of great interest from the ethnological point of view. It was formerly regarded as an excrement, and readers of Shakespeare will recall that there are four or five instances in his plays in which that term is applied to it. Cabanès devotes many pages to the sexual aspects of the subject, dating from the famous episode of Samson and Delilah. The growth of hair after the death of its possessor has been said to have occurred, and the assertion made that this was attested at the opening of the coffin of Napoleon in 1840, nineteen years after his death. Cabanès quotes the testimony of the naval surgeon Guillard, the only medical witness present at the occasion. Guillard stated that in passing his hand over the chin of the Emperor it seemed as though the hair had grown upon it, and the skin had a bluish tint. The legend that the Emperor's beard had grown has become widespread and firmly fixed in the popular mind and it is well that it should be authoritatively contradicted. Cabanès also discusses the medical aspects of the various customs of different epochs and races as regards going smoothshaven, or wearing whiskers, beards or moustaches. There are many curious customs in vogue among primitive people of today, as there were among the ancient ancestors of civilized man, in regard to the teeth and the various parts of the skeleton. Compression of the head or feet and trephining the skull are ordinary instances. The corset is a subject of great importance in its effect on the shape of the thorax and the viscera contained therein. The hand is a subject of great social and ethnologic as well as economic importance. The subject of the use of the right or left hand and of ambidexterity is given full attention, and even onychophagia, or nail-biting, is discussed at length. Among the famous onychophages Robespierre and Napoleon occupy prominent places, but with them we find similarly accused Berthier, Condorcet and the surgeon Dupuytren. It is unfortunate for the French reputation for politeness that Cabanès cites but one example other than those among his countrymen, namely Sir Hudson Lowe, Napoleon's famous gaoler.

Although more popular in its appeal this work constitutes a worthy supplement to the more strictly scientific compilation of Gould and Pyle on medical anomalies and curiosities.

Francis R. Packard.

Medical Heredity, Distinguished Children of Physicians (United States to 1910). By William Browning, M.D. The Norman Remington Co., Baltimore, 1925.

This is an original and quite unique study of the medical profession and warrants careful study because of the many different problems which it presents, and the interesting deductions which may be drawn from some of the array of facts which the Author has collected. Indeed we think that one of its chief uses will be to stimulate further research along some of the numerous lines which are suggested in almost every subdivision of the book. Thus in the "Classified Schedule of Names and Data," which gives information on children of physicians who have achieved prominence in various walks of life, names which might be added will occur to every reader, and a further study of the careers of many of those mentioned will frequently be prompted. This "Classified Schedule" is subdivided under various headings such as the Fine Arts, the Industries, Commerce and Business, Sociology, Education, Literature, Journalism, Theology, Public Life, Military, Adventure, Public Medicine, Engineering, Science and Miscellaneous. It is gratifying as well as astonishing to learn how many of the most prominent men in these various walks of life have been the offspring of physicians, and yet there are necessarily many omissions from such a list. A curious reason for some of these is advanced by Dr. Browning, viz., "a frequent custom with sons of medical men, more so than with some other callings, of not recognizing their professional parentage." He has collected 263 instances of this nature from the 1910 edition of "Who's Who in America." In all there are listed in this Classified Schedule over 6,000 names and from this large number the Author draws many interesting inferences. The data have been compiled from many sources, biographical dictionaries, genealogical tables, memoirs, histories of families, and so forth, and represents an immense amount of work, but as the Author admits in most instances no very definite deductions can be drawn from the premises. A curious record is that of certain families which possessed medical men in each generation for long periods. An instance of this kind is that of the Clemenceau family, "the Tiger of France" being the seventh doctor in lineal succession in as many generations of Clemenceaus. The longest succession which Dr. Browning has discovered in the United States is the eight generations of Porters who have flourished in Boston. There are several of seven generations, nine of six generations and six of five. Many of the most distinguished names in the profession figure successively in three generations. Dr. Browning has even gone into a study of the grandsons of physicians and of what he terms reinforced inheritance, where the direct line has been reinforced by marriage with another professional strain.

Such a book is very hard to review because it is really a compilation of data which have to be very fully analysed in order to be comprehended. Dr. Browning has entirely avoided any study of evil heredity in the profession, whether physical or moral. It would be an interesting supplement to his work if a study of criminals with medical progenitors were appended. We trust that Dr. Browning's work will meet with the appreciation it deserves. No man could have been better qualified for such a labor. His long experience as a neurologist and teacher, and his wide familiarity with medical literature, have been used to the best purpose in writing a book which will prove of value to students of sociology and social economics, as well as to those interested in the history of the medical profession.

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